JUNE 1955

# chemical processing

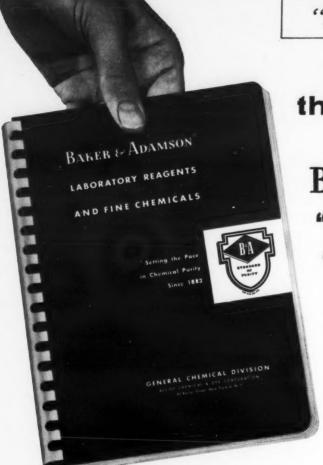
For Men Who Manage

SD extraction — low-cost way to aromatics 10
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Putman Publishing Company
IATORS OF PUTMAN - Style MAGAZINES

## DRUM DRYING A CHEMICAL

at Cyanamid's "New Product Department" in Warners, New Jersey See page 54



VALUABLE INFORMATION Arranged for Easy Reference

A GRAPHIC PRESENTATION OF

Practical, useful guide for all who buy and specify laboratory reagents . . . a book unique among its kind and with many outstanding features, including:

BAA LABORATORY CHEMICALS-Extensive alphabetical listing of more than 1,000 B&A reagents, complete with pertinent data, quality specifications, packages, etc. . . . your easy reference guide when ordering high purity chemicals.

PACKAGING SECTION - Covers dra-matic B&A advances in chemical packaging . . . containers of light-weight plastic and other materials, many with special pour-out and other features adding to the ease, convenience and safety of handling reagent chemicals.

STORAGE AND HANDLING — Detailed information on safe handling of chemicals requiring special precautions . . . and for the preservation of their purity and strength. Presented in easy-to-use tabular form; informa-tion that helps insure precision work and continuing savings.

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long experience in producing chemicals to exacting specifications in laboratory or process quantities.

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SPECIAL SECTIONS - Helpful information on product grades—B&A advances in labeling—shipping—general reference data—the B&A nationwide sales and distributing network.

Plus much more information you need in your day-to-day laboratory operations!

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# Baker & Adamson "Laboratory Reagents and Fine Chemicals"

Here is proof again that a catalog can be more than a mere listing. Baker & Adamson's new 1955 Products Book is a handsomely printed, 266-page illustrated guide to the services, products and special facilities of America's foremost producer of laboratory reagents and fine chemicals. It is a "must" for every purchasing agent, research director, chief chemist and educator who buys and specifies laboratory chemicals. For your copy-fill out coupon below, attach to your letterhead and mail today!



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Please send me your new edition of "Baker & Adamson Laboratory Reagents and Fine Chemicals."
NamePosition
Organization
Address



Looks like big job for "Old Sol"

Sunshine and sand combine to make possible a new kind of battery with infinite possibilities. Developed by Bell Telephone Laboratories, it is a simple looking apparatus, utilizing wafers of prepared silicon suitable for converting the sun's energy. Introduced last April, the battery had an



"How about that?-They're using sunshine to make moonshine!"

efficiency of 6%. By mid-October this had been improved to 8%-comparable to efficiency of steam and gas engines. The improved cells can be linked together to deliver power at the rate of 80 watts/sq ft of surface. Batteries have been demonstrated in powering telephone equipment and portable FM transmitters.

Recent forecasts of various authorities point to such potential uses of solar energy as providing power for irrigation, heating and cooling of dwellings, operating household appliances, and offering cheap current in areas where fuel costs

Instrument "sees" weather to aid flying

CP-6

\_State\_

An electronic device, called a transmissometer, is aiding flyers at one of our Air Force bases by "seeing" the weather. The instrument consists of a projector which throws a beam of light to a photoelectric detector. Intensity of the beam, as measured on a recorder at the base weather station, indicates amount of foreign material in the air, such as dust, fog, or precipitation. The beam can measure visibility down to 300 feet and, being located at the "touchdown point" on the runways, gives approaching aircraft precise visibility in formation, especially useful when ceilings are low and vari-

(Continued on page 223)

When inquiring check CP 7243 opposite last page

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Vol. 18

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JUNE, 19

## chemical processing

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June, 1955

No. 6

Serving more than 35,000 circulation in these industries:

Chemical & Allied Products Coke Oven Products Composition Materials, Fiber, etc Distilleries and Breweries Drugs, Cosmetics & Pharmaceuticals Fertilizers

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SPA



### **How to Put the Damper on Dampness**

HIGH HUMIDITY raises havoc in many a plant. Such was the case in the textile weaving room pictured above. Every maintenance paint tried on the structural steel, ceiling and brick walls failed prematurely. Finally, paints based on PLIOLITE S-5 were applied. The results were full satisfaction and protection against rust, mildew formation or saponification.

PLIOLITE S-5 is a high styrene-butadiene copolymer. It is used by leading manufacturers to make easy applying, fast drying maintenance paints. These high gloss finishes are easily maintained and unusually resistant to a wide range of acids, alkalies, oils, greases

To dampen completely any effects of moisture or chemicals in your plant, be sure to specify paints made with PLIOLITE S-5. Ask your paint supplier for details or write to: CHEMICAL

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### CHEMICAL PROCESSING • June, 1955 • volume 18 number 6



Over the editor's shoulder

#### Why "Case Histories"?

On page 14 of this issue, you'll find an article about the use of a wet-type dust collector at The American Sugar Refining Company, Brooklyn, New York. This is one of those "case history" stories that we've been talking so much about . . , the ones that discuss plant know-how and tell you how a plant improved its operations.

We visited the plant last December, obtained the necessary information and took the pictures for the story. But there's more to it than that. Where did the whole thing begin? Why did we decide to write it? Here's the story behind the story . . .

Back in June of 1953, CHEMICAL PROCESSING (pages 160-163) carried a new-product story about the collector. The article drew unusually high interest from our readers — as judged by the letters and Reader Service slips that came pouring in.

This was the automatic signal for us to go out after the follow-up story — to find out how the product performs in actual service, and to tell the readers about it. Because these stories involve plant know-how, they are the most difficult to get. But, thanks to such companies as American Sugar Refining, we are able to bring a number of them before you each month.

The process of getting stories, whether by this or other ways, is a continuous one. We hope it adds up to only one thing — more informative reading for the processing man.

FER F MENDER

ASSISTANT EDITOR

- For more information on articles and advertisements in this issue, check the handy Reader Service slip opposite last page
- The product directory, pages 214 to 217, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opposite last page

# Highlights in this Issue

Highlights for Next Month

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MONTH'S

One of the final operations at the Warners, N. J., plant of American Cyanamid Co. is the drum drying pictured on the cover. Facilities at Warners and Bound Brook, N. J., provide a source of new chemicals in medium-scale demand. Basic planning permits wide flexibility in producing many products. (Page 54).

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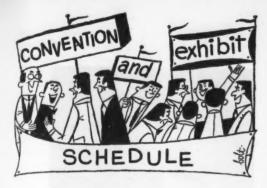
September Meeting.

September Colorists

September Lake Place

September Industry, Hotel, Sp

JUNE, 19



Association and Society addresses appear on page 213

- June 2-3. I.R.E. Materials Symposium, Univ. of Pennsylvania, Philadelphia, Pa.
- June 6-8. America Pharmaceutical Manufacturers Assn., Annual Convention, Greenbrier Hotel, White Sulfur Springs, W. Va.
- June 6-10. Sixth Annual Conference on Industrial Research, Columbia University, New York, N.Y.
- June 9-11. Manufacturing Chemists Assn., Annual Outing in conjunction with SOCMA, Greenbrier Hotel, White Sulfur Springs, W. Va.
- June 12-15. National Plant Food Institute, Greenbrier Hotel, White Sulfur Springs, W. Va.
- June 20-23. Forest Products Research Society, National Meeting, Olympic Hotel, Seattle, Wash.
- June 26-July 1. American Society for Testing Materials.
  Annual Meeting, Chalfonte-Haddon Hall, Atlantic City,
  N.J.
- June 27-29. American Nuclear Society, First Annual Meeting and Technical Conference, Pennsylvania State Univ... State College, Pa.
- July 11-22. "Behavior of Materials at Elevated Temperatures", Special Summer Session, Massachusetts Institute of Technology, Cambridge, Mass.
- July 12-14. Western Plant Maintenance and Engineering Show, Pan Pacific Auditorium, Los Angeles, Calif.
- August 24-26. Western Electronic Show and Convention, Civic Auditorium, San Francisco, Calif.
- September 6-17. Production Engineering Show, covering field of Automation, Navy Pier, Chicago, Ill.
- September 11-16. American Chemical Society, 128th National Meeting, Minneapolis, Minn.
- September 12-16. Instrument Society of America, 10th Annual Instrument Conference and Exhibit, Shrine Exposition Hall and Auditorium, Los Angeles, Calif.
- September 14-16. National Petroleum Assn., Annual Meeting, Traymore Hotel, Atlantic City, N.Y.
- September 22-23. Chemical Market Research Assn., Annual Meeting. The Cavalier, Virginia Beach, Va.
- September 22-25. American Assn. of Textile Chemists and Colorists, Atlantic City, N. J.
- September 25-28. American Institute of Chemical Engineers, Lake Placid Club, Lake Placid, N.Y.
- September 28-30. Technical Assn. of the Pulp and Paper Industry, Sixth Testing Conference, Sheraton-Kimball Hotel, Springfield, Mass.

# JEFFERSON CHEMICALS

Ethylene Oxide—A highly reactive chemical intermediate, for use as a starting material in the manufacture of acrylonitrile and nonionic surface active agents; a sterilizing agent and fumigant.

Ethylene Glycol—For use as a nonvolatile antifreeze; a heat transfer medium; a raw material in the manufacture of low-freezing dynamite; a starting material for the production of synthetic fibers and alkyd resins; a plasticizer; a constituent of hydraulic fluids; and a general solvent and chemical intermediate.

Ethylene Dichloride—For use as an ingredient of tetraethyl lead fluid, a fruit degreening compound and agricultural fumigant; a solvent for fats, oils and waxes; a metal degreaser; a spotting agent for textile cleaning; a chemical intermediate for use in resin manufacture and in other processes.

**Diethylene Glycol**—For use as a dehydrating agent for natural gas; a moistening agent for tobacco, glue and gelatin; a textile lubricant and coupling agent; a solvent in textile dyeing and printing; a constituent of hydraulic fluids; a heat transfer medium.

Monoethanolamine — For use as a gas scrubbing agent for recovery of hydrogen sulfide and carbon dioxide; a chemical intermediate in the manufacture of various surface active agents, rubber chemicals and other materials; a vehicle in the manufacture of antibiotics.

**Diethanolamine**—For use as an intermediate in the manufacture of surface active agents used in textile specialties, herbicides, petroleum demulsifiers, etc.; as a gas scrubber in refinery operations; as a rubber chemicals intermediate.

**Triethanolamine**—For use as an intermediate in the manufacture of surface active agents used in textile specialties, waxes and polishes, herbicides, petroleum demulsifiers, cosmetic preparations.

rations, cement additives, cutting oils, etc.; as a rubber chemicals intermediate.

Nonyi Phenol—For use as an anionic and nonionic surface active agent intermediate; as a starting material for the manufacture of lubricating oil additives, stabilizers, petroleum demulsifiers, oil-soluble phenolic resins and plasticizers.

Morpholine—For use in the manufacture of surface active agents, rubless waxes and polishes, rubber curing agents, corrosion inhibitors, antioxidants, catalysts, plasticizers, dyes, agricultural chemicals, separating agents, bactericides, pharmaceutical chemicals and textile lubricants.

Ethylene Carbonate—For use as a solvent for acrylonitrile polymers, lignin, nitrocellulose, nylon, vinylidene chloride-acrylonitrile copolymer, cellulose acetate and other polymeric materials; in the preparation of agricultural chemicals, resins, fungicides, pharmaceuticals and plasticizers.

Propylene Carbonate — For use in hydraulic fluids; as a solvent for cellulose resins, bisphenol resins and other polymeric materials; and as an intermediate in the preparation of agricultural chemicals, resins, fungicides, pharmaceuticals and plasticizers.

Glycerine Carbonate — For use as an intermediate in the production of glycidol; as a solvent for cellulose acetate, nylon, nitrocellulose and polyacrylonitrile; and as an extractive solvent in certain aliphatic and aromatic hydrocarbon separations. Available in trial lot quantities.

Polyethylene Glycols — For use in lotions and creams; vehicles for antibiotics, dentifrice active agents, antihistamines, antiseptics, fungicides, anesthetics, peroxides and sulfa drugs; lubricant for suppositories; and as an extender in cold hair-waving solutions.

Most products shipped in tank cars, tank wagons and 55-gal. drums. Write your nearest Jefferson office for technical information, availability and price schedules.

Samples are available for your investigation.





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# TEFLON AGITATORS

This new TEFLON Agitator replaces the conventional glass covered agitator used in glass lined equipment. It will not chip or break since it is not brittle. The blade, made of solid TEFLON, is driven by a TEFLON covered steel shaft...it is not driven by TEFLON.



driven by TEFLON. The agitator is 72" in overall length with a 36" blade.



## TEFLON TEES

Flanged TEFLON Tees for use in glass piping systems are available for practical-

ly the entire range of pipe sizes. They have a working pressure of 75 p.s.i. at 250 deg. F.

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. . . by DORE

If you handle corrosives, there is a place for TEFLON in your operations — and the place to get the TEFLON shapes and special equipment you need is John L. Doré Company.

We have the engineering skill and production facilities to design and build the special TEFLON shapes you need. Send us your requirements and we'll submit a solution with TEFLON.



When inquiring check CP 7246 opposite last page



DR. R. W. McNamee received his B.S. in chemistry from the University of Akron in 1929. He went on to Northwestern University where he received his M.S. in 1931 and Ph.D. in 1933. He joined the Research and Development Department of Carbide and Carbon Chemicals Co., Div. of UCC, in 1933.

In 1949, Dr. McNamee was appointed Acting Superintendent of Carbide's Research and Development Department, and in 1950 was made Superintendent of the Department. In 1953 he was appointed Manager of Research Administration of UCC with headquarters in New York.

Dr. McNamee is a member of the ACS, AIChE, and of the professional societies Sigma Xi, Alpha Chi Sigma, and Phi Lambda Upsilon.



MR. L. E. ERLANDSON received his B.S. in chemical engineering from the Armour Institute of Technology in 1922, and was employed by Universal Oil Products Company. In 1925 he joined Carbide and Carbon Chemicals Company, a Division of UCC, as chemical engineer. He later became administrative assistant to Mr. J. A. Rafferty who was then President of the Company. In 1951, Mr. Erlandson was appointed Secretary of the Research Committee of UCC.

Mr. Erlandson is a member of the ACS. He also belongs to the Chemists' Club, New York, where he has been Treasurer since 1951.



# the economic value of research

DR. R. W. McNAMEE and MR. L. E. ERLANDSON
Carbide and Carbon Chemicals Company, a
Division of Union Carbide and Carbon Corp.

THE questions "What is the value of research?" and "How much research should we do?" can be answered today with far less speculation than was the case a few years ago. In answering the first question the industrial chemist looks immediately to the sales figures of his company. He knows that there is no instantaneous relationship. It takes time for the economic effects of research to manifest themselves. In some instances the full effects may not be evident until ten or twenty years have passed. However, with various data available it is possible to show a relationship between sales increases and past research expenditures.

Let us take a look at the financial records for the past fifteen years of a group of chemical companies.\*
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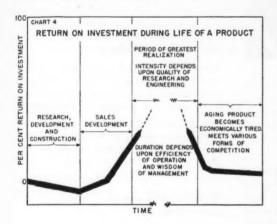
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panies.\* Total sales of 1953 for the companies involved amount to \$3,922,000,000 or roughly 20% of total sales for the industry. Since these companies spend somewhat more than the average on research, this means that approximately one-fourth of the total industrial chemical research effort is being considered.

A good estimate based on available data shows that approximately 30% of 1953 sales for the subject companies came from products which have come into production in the last ten years as a result of research activities.



Based on expenditures for research over the fiveyear period, 1939 to 1943, we find that for each dollar expended for research \$3.50 of annual sales are induced four years after the end of the research expenditure period. From available data, the corresponding figure after a lapse of ten years is \$6.80. In other words, for every dollar of research expenditure made from 1939 to 1943, inclusive, \$6.80 was returned by sales in 1953.

Total sales induced per dollar of five-year research expenditure in the fourth through the tenth years after research was completed amounted to \$36. For these companies in this period this meant a profit in excess of \$7.20, before taxes, on each dollar of previous five-year research expenditure.

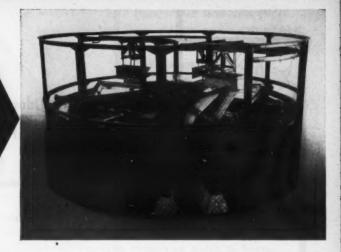
"In excess" is used advisedly because new products are generally more profitable than the old. This is pointed up in Chart I which depicts, in a general way, the economic history of a successful product of research.

Summarizing to this point, it can be said that we have a better than qualitative method of evaluating research.

(Continued on page 212)

# THIS IS

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- whenever you want to filter tonnages, big or small, using only one Filter (no stand-by equipment required)



... whenever you're dealing with materials that tend to blind filter cloths

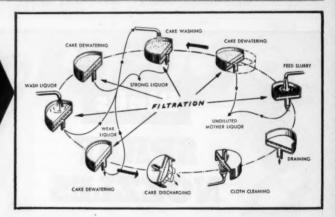
the BIRD-PRAYON Continuous Rotary Horizontal

VACUUM FILTER

# THIS SHOWS

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As many as five stages of counter-current wash are permitted. Wash liquors are kept completely separate from the mother liquor and from each other. Evaporation costs are slashed.



Complete cake discharge is effected by the 180° tray inversion. The cloth is clean as new each time it takes the feed.

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on this efficient, useful Filter. Ask us to send you the new Bird-Prayon Filter Bulletin — just off the press. BIRD MACHINE COMPANY
SOUTH WALPOLE - MASSACHUSETTS

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<sup>\*</sup>Remember, please, that during this period sales of the chemical industry increased approximately 500% and the value of the dollar fell about 50%. During this period also, expenditures by the industry for research and development approximated 3.2% of annual sales. This was also a period during which taxes increased substantially.



# Don't Let The Odor Imp Menace Your SALES EFFORTS!

**DEODALL** #1 has proved effective in commercial practice for masking solvent odors and the unpleasant scent of other petroleum products. *Déodall* #1 gives high performance at *low* cost in a wide variety of applications. Why not send us a sample of your product for laboratory study and recommendations.

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# what you can expect in next month's issue...

Combatting
Corrosion—
a CP feature

Our response to your interest in the expanded section on corrosion carried last December is more of the same for

July. Introducing the feature is NACE President F. L. Whitney, Jr., of Monsanto (above). As "Guest" Editor, this outstanding authority on corrosion problems and control tells of the role of corrosion engineers in combatting corrosion.

Among the many on-the-spot installation accounts is one from Standard Oil Co. (Ohio) on controlling corrosion in open box condensers with an aluminum-anode impressed-current cathodic protection system. Chief Inspector Charles Ball and CP's corrosion editor Gordon Weyermuller developed the story.

Another "how-it-was-done" story describes how vinyl coatings were used to solve a severe corrosion problem in the caustic and acid area at Cities Service, Lake Charles, La.

At Globe Chemical Company plants in Cincinnati, Dayton, and Louisville, failure of metal and alloy pipes at three to twelve month intervals was proving costly and hazardous. How Globe licked the problem and cut costs by specifying plastic for all corrosive services is another one of the "case histories" reported in next month's issue



CP's popular "Corrosion Keys" — corrosion data in easy-to-use form developed by Associate Editor Bruce Fader — will be continued with a fast rundown on coatings, plastics, and alloys.

Other features include condensations of technical papers from the recent NACE Annual Meeting, and many developments in coatings, alloys, plastics, inhibitors.

#### "Mechanical man" tester aids production at Pillsbury

Virtually a mechanical man, moisture tester developed by Pillsbury Flour Company takes its own sample, weighs it, drives off water with heat, reweighs and records.

For the story of how it works and its performance record at Pillsbury, see the Ideas section feature next month.

# Phenolic-lined drums carry chemicals

A Packaging section highlight for July tells how Wright Chemical Co. of Chicago ships and stores its water-conditioning chemicals. Steel drums lined with a specially-developed phenolic do the job.

Improve, speed wheat starch separations



An editorial visit to Huron Milling Company, Harbor Beach, Mich., resulted in a story on how the company has improved and speeded wheat starch separations by using continuous centrifuges.

Two-stage centrifugal process replaces large, bulky settling vats and tables, using only 1/3 the floor space. Method also cuts processing time from eight hours to five minutes, ups yield 25%. Photo above shows an operator checking viscosity on one of the first-stage separators.

Story is a "New Solutions" highlight.

Here's a of feature in July'

Propert with fin

Material propertic has been esterifica combine an inorg an organ

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be obtain pump, in titanium in the I Safety h on safety book for ation) is

CP feature a compl

application

Here's a quick preview of features you'll find in July's Chemical Processing

#### Properties, uses of silica with fine particle size

Materials section feature next month discusses properties and uses of a fine-particle-size silica that has been made hydrophobic and oil-wettable by esterification with a monohydric alcohol. Product combines reinforcing and thickening properties of an inorganic agent with the ease of dispersion of an organic.

#### Automation

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Proportioning rubber accelerator has become an automatic operation. Method, now working satisfactorily, was developed by Goodyear Tire subsidiary, Pathfinder Chemical, Niagara Falls, N.Y. Associate Editor Bruce Fader developed the story, an Instruments feature next month.

#### And In Brief . . .

How ultimate pressures of only 0.0000001 mm can be obtained with a newly-developed ion vacuum pump, in which gas molecules are removed by titanium evaporation, is detailed in a story featured in the Engineering and Maintenance . . . in a Safety highlight next month Jim Duggan's data on safety of storage tanks (recently published in book form by the National Fire Protection Association) is given in condensed form.

#### In September . . .

CP features another of its regular sections with a complete rundown on instruments for every application.





## The exclusive grid-groove design of **FALK Steelflex Couplings** protects your machinery in two ways

You get double protection when you connect your driving and driven machinery with a Falk Steelflex Coupling-the allsteel-built coupling with the exclusive grid-groove design! First, its torsional resilience smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery...are trouble-free and need minimum maintenance...are easy to install, lubricate and disconnect ... and cost less per year of service than ordinary couplings.

One basic Steelflex design-the Type F, in its many sizesis adaptable to more than 90% of all industrial applications. This facilitates buying, as well as prompt replacing and servicing when necessary. Write to Department 247 for engineering bulletin, including selection and dimension details.

#### THE FALK CORPORATION, Milwaukee 8, Wisconsin MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives Single Helical Gears Herringbone Gears
- · Marine Drives • Steel Castings

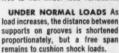
#### • Contract Machining

#### How shock and vibration are smothered by the FALK Steelflex Coupling's Torsional

Resilience . . .

This cutaway view shows the sturdy all-steel construction, also the exclusive, torsionally resilient grid-groove design. Here is how the grid-groove design functions:

UNDER LIGHT LOADS The gridmember bears only at outer edges of grooves. The long span between points of contact remains free to flex under load variations.



UNDER SHOCK LOADS Under extreme overloads, the gridmember bears fully on the grooves and transmits full load directly. The coupling





#### SHAFT MISALIGNMENT ACCOMMODATED Free End Float Permitted

Controlled flexibility in the FALK Steelflex coupling provides compensation for parallel and angular shaft misalignmentand permits free end float for the shafts of the driving and driven members, or of either one.











FS-Limited Space







#### OTHER TYPES AVAILABLE

In addition to the standard Type F (which meets more than 90% of all applications), special or dual purpose Steelflex designs are available for unusual applications. A few of the many types are shown here.



...a good name in industry

When inquiring check CP 7249 opposite last page



Process at Continental Oil Company's Lake Charles refinery provides—

# aromatics by SO<sub>2</sub> extraction

JAMES B. DALY, Senior Technologist Continental Oil Company, Lake Charles, La. with GORDON WEYERMULLER, Associate Editor

Product which meets
requirements for end use
in detergents is made in
flexible unit, with yield of
96 per cent

OPERATING results obtained from Continental Oil's liquid sulfur dioxide process since it was placed on stream in Oct. 1953 have shown it to be an attractive, low-cost method for extraction of aromatics. The Lake Charles refinery is the first plant to extract benzene, toluene and xylene simultaneously from naphtha by the modified SO<sub>2</sub> process, which has features that simplify operations and lower initial investment costs.

One reason for the economy of the process is that design of plant allows 96.5% of the benzene and 95% of the toluene and xylene to be recovered with a single extraction tower. Unit also provides single-stage separation of the  $SO_2$  from the raffinate.

Process produces a grade of benzene satisfactory

for use in manufacturing company's synthetic-detergent alkylate, Neolene 400. Required benzene purity of 98.5% or greater for this use is achieved by an inexpensive azeotropic separation with methanol. Toluene-xylene fraction, which runs 98-99% aromatics, is not separated but is utilized as a component of aviation gasoline.

The charge to unit is a depentanized light catalytic reformate produced by a UOP platformer. A heart cut naphtha is used for the platformer feed. Sulfur dioxide is obtained in tank cars. Light reformate enters the SO<sub>2</sub> extraction unit at a rate of 3570 bbl per day through a water dropout tank. Reformate then passes through two alumina dryers which decrease water content to 30 ppm. Presence of appreciable water in the system can cause serious corrosion problems.

Temperature of reformate is lowered to about 5°F in precooler and then passed through tubes of a Sweco charge chiller which drops the temperature to -25°F. Interior of chiller contains three tube bundles, two of which are used respectively for cooling naphtha and wash oil entering the treating tower, and the third for chilling vent gas

streams to recover SO<sub>2</sub> from them. Sulfur dioxide coming from compressors circulates as a cooling medium on shell side of chiller.

Cold naphtha is charged at a rate of 3570 bbl per day to the treating tower which contains four Raschig-ring-packed sections. Naphtha flow enters the tower between the two center sections.

Relatively light naphtha tends to flow countercurrent to the heavier  $SO_2$  coming from top. Aromatics in charge are dissolved in  $SO_2$  phase and are carried to base of tower. In the extraction, 96.5% of the benzene and 100% of the toluene and xylene are recovered. Raffinate phase, which contains a small amount of  $SO_2$ , overflows from top of tower. The tower operates at 5.4 psia, maintaining the low treating temperature of -20to  $-24^{\circ}F$ .

Wash oil is introduced into the treating tower below the bottom-packed section, at a rate of 2500 bbl per day, for the purpose of displacing the light paraffinic and naphthenic components of the charge from the extract. This wash oil is of a sufficiently high boiling range (kerosene range) that it can be separated from the extracted aromatic component, or the raffinate, by simple distillation.

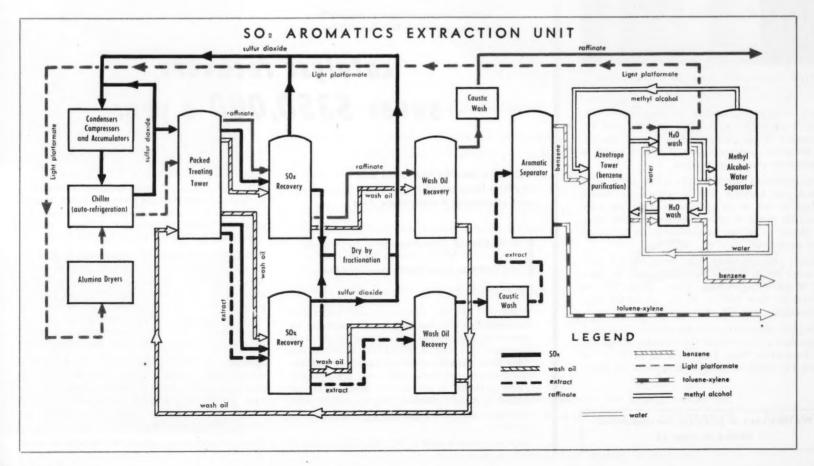
Raffinate solution is separated in a fractionator containing 20 bubble trays. Close temperature control permits all of the sulfur dioxide to be removed from the raffinate in this one tower at operating pressures of 75 psig. Sulfur dioxide is recovered from the extract in two stages. Raffinate and aromatics are washed with caustic to remove last traces of sulfur dioxide. An average of 0.5 lb of SO<sub>2</sub> and 0.5 lb of caustic is consumed per bbl of light reformate charged.

Sulfur dioxide in raffinate and extract fractionators is kept dry by taking slip streams from center of towers and passing them through distillation columns. Removal of this water mitigates corrosion. Plant is considering obtaining an infrared analyzer for determination of water. Type 316 stainless steel is used in recovery system.

Aromatic concentrate is charged to benzene tower, benzene being taken overhead and the toluene-

(Continued on next page)

Plant design:	Maria Caralan
Charge capacity, bbl per day	3570
Plant cost, dollars	2,666,000
Direct operating costs in cents	
per bbl of charge:	
Fuel	5.2
Cooling water	2.1
Power	1.1
Steam	1.3
Subtotal	9.7
50,	1.3
Chemicals	1.5
Labor	5.6
Maintenance	6.0



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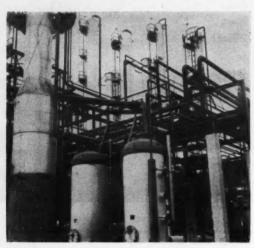
#### SO, EXTRACTION

(Continued from preceding page)

xylene fraction from the bottom. Azeotropic distillation of the benzene with methanol raises purity to 98.5% or greater. In this way the paraffin, olefin, and naphthene content is reduced so that product is satisfactory for use in detergents.

Costs, as indicated by operations so far, are shown in table.

Since sulfur dioxide aromatics extraction plant is highly instrumented, only two men per shift are required for operation of unit. Plant will run by itself unless there is an upset or change in the feed



Light reformate passes through two alumina dryers for maximum removal of water

stock. Another outstanding advantage of the SO2 unit is its flexibility. It could easily be used for aromatics in gas oils, for production of toluene, or for other purposes if plant should ever wish to discontinue producing benzene.

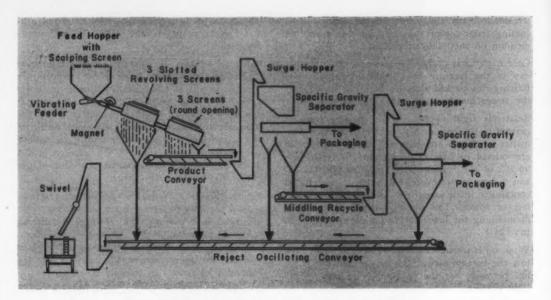
One interesting safety feature is the dump valve which can instantly take air off of all control valves in case of an emergency. They are automatically preset in safest position - either open or closed - serving as protection for personnel and equipment.

(Sulfur dioxide plant was designed and constructed by the Badger Process Division of Stone & Webster Engineering Corp., Dept. CP, 90 Broad St., New York 4, N. Y. . . . or for more information check CP 7250 opposite last page.)

(Neolene 400 intermediate for synthetic detergents is product of Continental Oil Company, Dept. CP. 30 Rockefeller Plaza, New York 20, N. Y. . . . or check CP 7250A on handy form opposite last page.)

For more news on processes, see Idea section, starting on page 54.

#### new solutions of processing problems



Flow through major pieces of equipment in catalyst recovery device

Based on size-density separation, system in use at Humble Oil for -

# catalyst recovery saves \$350,000 a year

Besides returning five times cost of plant investment in one year, unit eliminates troublesome dust

S. W. DEDMAN, Project Engineer Humble Oil & Refining Company, Baytown, Texas with GORDON WEYERMULLER, Associate Editor

Former procedures used for catalyst recovery at Humble Oil Company, Baytown, Texas, were relatively inefficient. At first, hand screening was used, and later, a mechanical shaker screen. Since these methods were based on size separation alone, deactivated whole pills were not removed. These methods, in addition to being inefficient, created a dusty condition (Fig 1), which made working conditions undesirable and was a

Catalyst, which is used in hydroformer, consists of

molybdena on an alumina base. In physical appearance, catalyst is a 3/8" pellet and, when fresh, has a relatively high crushing strength. If the weaker pills could be broken and separated from stronger pills by screening, average catalyst activity throughout the system would be increased.

This scheme was tried in a batch-wise manner by rotating catalyst in a conventional concrete mixer. Weak pills were broken and remaining whole pills recovered by screening. This was an improvement over screening technique alone, but efficiency was still relatively poor. It was not possible to break all of the weak pills by this method without damaging some of the strong pills.

Solution: Examination of physical properties showed that average crushing strength could be correlated with catalyst's apparent bulk density. This suggested possibility of separating spent catalyst from reusable catalyst by a method involving density as well as size.

Manufacturers of equipment for separations based

on both possibili lar job. sisting o tables fo ficiency catalyst. catalyst first of i placed in are integ tion. Ca elevated collect 1 number. passes ca remove : welding Material screens w





on both size and density were contacted as to the possibility of applying their units to this particular job. Samples of catalyst run in equipment consisting of graders for size separation and gravity tables for density separation indicated a high efficiency in removing inactive catalyst from active catalyst. On the basis of these tests, commercial catalyst recovery plant (Fig 2) believed to be the first of its type in this country, was designed and placed in operation in May 1953.

Chart shows how individual pieces of equipment are integrated to allow automatic catalyst separation. Catalyst to be separated is loaded into an elevated feed hopper covered with a bar grate to collect large foreign objects, relatively few in number. Electronically controlled screening feeder passes catalyst through magnetic separators which remove small metallic objects such as nails and welding rods.

Material then goes to three revolving cylindrical screens with slotted openings. All catalyst smaller

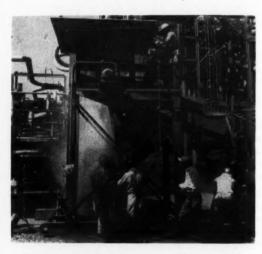
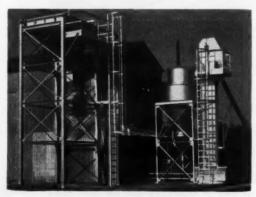


Fig I-Dust from former inefficient method of catalyst recovery created undesirable working conditions

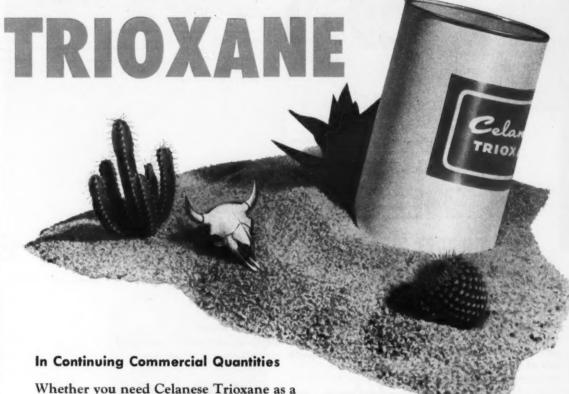
Fig 2-Present catalyst recovery device has greatly improved efficiency of separation, eliminated dust



(Continued on page 16)

## formaldehyde isn't "formaldehyde" any more

for an anhydrous source it's Celanese\*



source for dry formaldehyde gas . . . as a stabilizer for trichloroethylene solutions . . . as an electroplating bath constituent . . . or as a component for the azeotropic separation of hydrocarbon mixtures, you're always assured of commercial quantities.

We'll be glad to help your development work with samples and technical guidance. Write to

Celanese Corporation of America, Chemical Division, Dept. 591-F 180 Madison Avenue, New York 16.

\*Reg. U. S. Pat. Off.

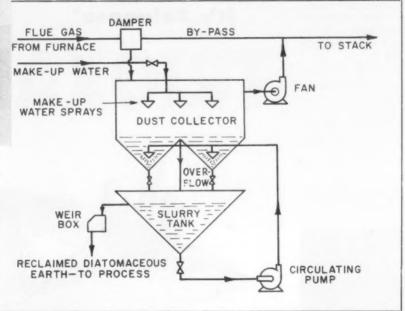
Only Celanese offers the right formaldehyde for every purpose PARAFORMALDEHYDE . FORMCEL SOLUTIONS . FORMALIN

TRIOXANE



Drawing shows operating principle of unit. Dust is separated from air by centrifugal action. Water (lower portion) wets, entraps dust

Flow diagram illustrates wet-type dust collector installation at The American Sugar Refining Co.



Just like "killing two birds with one stone" —
American Sugar Refining Company installs wet-type
dust collector, avoids air pollution problem, and . . .

# reclaims over 90% filter aid from flue gas

G. J. KREBS, Plant Engineer The American Sugar Refining Company with TED F. MEINHOLD, Assistant Editor

Problem: Fine particles of diatomaceous earth were being carried over by a flue gas discharge of 7000 cfm at 450°F from regenerative furnace at The American Sugar Refining Company, Brooklyn, New York. Not only were considerable amounts of the valuable filter aid being lost, but the company was faced with a potential air pollution problem.

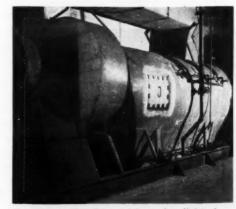
Solution: Because of the high temperature of the gas and the corrosive and erosive effect of its constituents, it was decided to install a wet-type dust collector. Known as the "Air Tumbler" (see CHEMICAL PROCESSING, June 1953, pages 160-163), the unit is essentially a stationary screw within a horizontal, pear-shaped barrel. Dust-laden air enters at one end of the barrel under suction of exhaust fan on outlet at opposite end.

During its flow within the barrel, dust is continuously centrifuged through four revolutions along a helical path formed by the screw. Lower portion of barrel contains water, surface of which is swept by the air stream. Angular impingement and friction of air against the water induces water to flow around periphery of barrel. Dust is separated from the air by the centrifugal action, while water wets and entraps the dust. Sludge collects in hopper.

Elimination of barriers, reuse of water, and fact that at no point is air required to abruptly change its course accounts for the economical and efficient performance of the unit. Since the continuous sheet of water stays against the inner surface of shell and never crosses or intermixes with the air stream, cooling and humidification of air is minimum.

Continuous hydraulic removal of sludge was accomplished by installing a slurry tank and circulating pump below the hopper (see diagram). Agitation caused by circulation prevents blocking of hopper drains and permits continuous draw-off of the diatomaceous earth slurry through a weir box.

Results: Unit reclaims approximately 1500 lb



Upper view of collector. Exhaust fan (left) draws dust-laden air into unit through duct (upper)

Slurr

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Dust Sup CP, P.O. more info

Recla

JUNE, 19

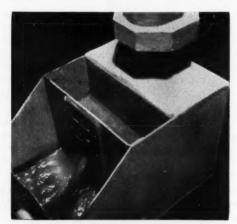


Slurry tank and circulating pump provide for continuous hydraulic removal of sludge

of dry diatomaceous earth per 24 hr day. Field tests indicate efficiency of at least 90 per cent preventing an air pollution problem. Collector is cleaned weekly in order to keep maximum operating efficiency. Pressure drop through unit is about 2" water, which is overcome by the exhaust fan attached to the tumbler.

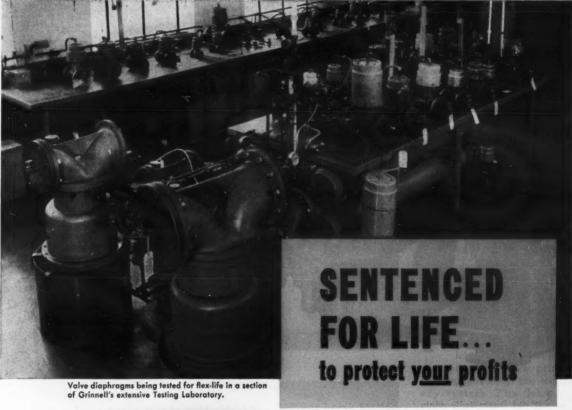
Minor problem of excessive build-up of material on the internal helices was corrected by installing a Yarway type-B water spray nozzle at each turn of the helix. Make-up water, at rate of 2.5 gpm, is introduced against the collector shell to wash the material down. Overall dimensions of collector is 14'11" x 9'7" x 3'7" wide.

(No. 6 Type W Air Tumbler used here is product of Dust Suppression and Engineering Company, Dept. CP, P.O. Box 67, Lake Orion, Michigan . . . or for more information check CP 7252 opposite last page.)



Reclaimed diatomaceous earth slurry leaves system through weir box

See regular Engineering & Maintenance section starting on page 162.





Rubber mill for mixing experimental diaphragm compounds.

#### Check these important features:

- Diaphragm absolutely isolates working parts from the line fluid.
- Diaphragm lifts high for full, streamline flow in either direction
- Diaphragm effects positive, leak-tight closure.
- Body, lining and diaphrage materials to suit service. Diaphragms easily replaced without removing valve be

#### **GRINNELL-SAUNDERS** DIAPHRAGM VALVES



# GRINNELL-SAUNDERS DIAPHRAGM VALVES

have won an envied reputation for long, trouble-free service under the toughest operating conditions. One reason is Grinnell's continuous test program. In this life-test laboratory, valves and diaphragms operate day and night, through thousands of opening and closing cycles, to pre-prove performance. Result - better valves for all types of services.

This program of continuous testing is the basic reason why so many different industries are turning to Grinnell-Saunders for diaphragm valves with preproved performance. There are standard types for a wide variety of applications . . . in the handling of corrosive liquids, gases, beverages, compressed air, fluids loaded with suspended solids - on lines where leakage, corrosion, clogging, abrasion, or contamination could be costly.

Are your valves giving you the dependable, long service life you must get to maintain economy and efficiency? If they are not, it will certainly pay you to consult a Grinnell engineer.



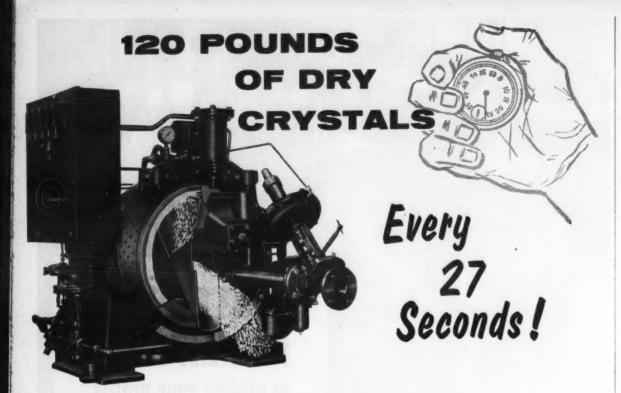
Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

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When inquiring check CP 7253 on handy form, pgs. 2-3

ING



The Sharples Super-D-Hydrator is giving this kind of performance day in and day out—and crystal moisture is held to well under 2%.

The remarkable efficiency of this centrifuge results from the combination of high centrifugal force, the relatively small unit load of crystals that is handled very rapidly and continuously, adjustable cyclic operation, and rugged corrosion-resistant construction to withstand the most rigorous service.

The Super-D-Hydrator offers complete flexibility of control to obtain optimum performance... any part of the cycle may be adjusted while the centrifuge is in operation... as many as 3 different rinsing media may be applied to the crystal cake, independently... mother liquor and rinses can be kept separate through the use of special "diversion valves"... automatic protection against unbalance and overloading is "built-in".

Available in two sizes, the Super-D-Hydrator is setting new standards in crystal dehydration efficiency and consistent uniformity of product.

Get the facts about Low Cost, High Performance Crystal Drying. Sharples Bulletin 1257 is the starting point. We'll gladly send you a copy.



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When inquiring check CP 7254 opposite last page

#### NEW SOLUTIONS of processing problems

#### CATALYST RECOVERY

(Continued from page 13)

than acceptable passes through slots and falls into reject conveyor. All remaining material larger than acceptable, such as clusters of pellets, is retained on a second set of revolving screens with round recessed holes. Unacceptable material is conveyed to end of screens by revolving motion where it falls into reject conveyor. Good catalyst passes through the round holes.

Product conveyor and bucket elevator carry catalyst to a surge hopper equipped with high and low level controls. Catalyst is fed to a specific gravity separator that is started and stopped by surge hopper level controls.

Specific gravity separator classifies material by weight, by causing it to flow across the surface of a reciprocating deck which is covered with a porous cloth through which air is blown. Catalyst is floated and stratified by air, heavier particles settling and lighter particles rising to top of bed. Volume of air, along with oscillation and slope of deck convey active heavier pills to high end where they are discharged. Lighter pills travel across line of motion of deck and are discharged at lower end to reject conveyor.

Middling product, part good and part bad, is reclassified by density in a similar fashion in a second specific gravity separator. Active catalyst is collected in product hopper, dropped into drums, and trucked to storage. Bucket elevator lifts rejected material and allows it to drop through swinging chute into gondola car.

All equipment is totally enclosed in order to prevent dust from entering atmosphere. From ducts connected to each piece of equipment, duct is drawn through 15-hp blower and discharged to cyclone separator where it is efficiently collected.

Results: Catalyst recovery system which cost about \$70,000, has saved \$350,000 by increased recovery of active catalyst. In addition to this saving of five times its cost in one year, recovery plant has improved working conditions by eliminating the dust which had been a nuisance.

After overcoming minor operating difficulties at the beginning, equipment was operated satisfactorily at its design capacity of 3000 pounds per hour. More than 750 tons of hydroforming catalyst was processed in first six weeks of operation. About 75% of the total catalyst charged was recovered.

(For further information on revolving cylindrical screens, called precision graders, check CP 7255 on handy form opposite last page.)

(Information on specific gravity separators may be obtained by checking CP 7255A opposite last page.)

(For further information on bucket elevators and oscillating conveyors check CP 7255B on handy form opposite last page.)

Eroded with pol

Problem: of water tion's Bigradually in some paper thi



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man-hours
Solution:
polyester la
two plies of
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Leaks were
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# Eroded water header repaired with polyester resin

Problem: Erosion damage to 40-foot section of water header was so bad at Celanese Corporation's Bishop, Texas, plant that the pipe was gradually disappearing. There were large holes in some areas and the balance was rusted almost paper thin. Pipe, which normally runs half full,



Before — Eroded section of water header had large holes, was rusted paper thin

had about 20 holes below the water level. Costly man-hours would be required to replace section.

Solution: Repairs were made with reinforced polyester laminate. First, scale was knocked off and two plies of glass cloth, saturated with self-curing

blend of MR-28C resin, were applied over the large holes. Leaks were plugged and two additional plies of the saturated cloth were wrapped about entire rusted area of pipe, one at a time.

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Results: Work was done without removing any connections or the pipe itself. Only 30 gallons of resin were required and total material costs amounted to only \$137.88. Laminate will not rust or rot and its moisture absorption

is less than half of

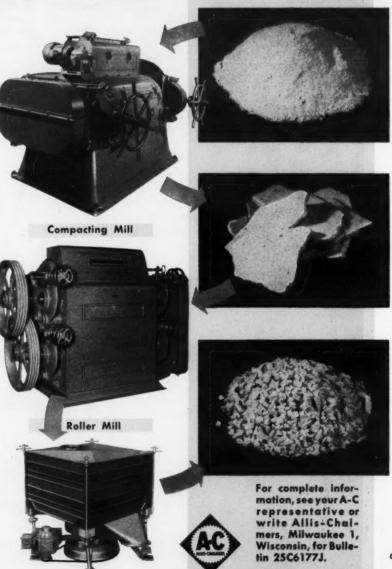


After — Repaired in-place with polyester resin, header easily supports weight of man

one per cent. Repaired section can easily carry weight of a man. In event of accidental rupture, it is only necessary to apply additional laminate.

(MR-28C Resin is product of Celanese Corporation of America, Dept. CP, 180 Madison Avenue, New York 16, N. Y. Check CP 7256 opp. last page.)

# PROCESS SYSTEM Converts Fine Particles Into Granular Product To Meet Consumer Demand



Circle Sifter

Recovery operation starts with unacceptable minus 30 mesh chemical salt — fines created in original process.

An Allis-Chalmers heavy duty compacting mill is the principal component in the recovery system. The flakes or slabs illustrated are the result of mechanical densification in the compacting mill. An Allis-Chalmers two-pair high corrugated roller mill is used to granulate flakes. Final separation is made in the Circle sifter - an Allis-Chalmers gyratory screen. An 80% to 90% recovery of salable product is effected.

The resulting granules (100% minus 3 mesh and 100% on 10 mesh) equal or surpass natural product in every respect. Reconstituted product differs little from parent product in abrasion tests. Other tests have proved the compacted granule superior in controlled solubility. Granulated product is more uniform in particle size, flows more freely and has better "eye-appeal."

A-4743

Circle is an Allis-Chalmers trademark.

**ALLIS-CHALMERS** 

When inquiring check CP 7257 opposite last page

## "Magic equation" sought for cooling towers . . .

will enable engineers to predict performance of decking

Engineers at cooling tower laboratory outside of Independence, Mo., are searching for the "magic equation" that will enable them to predict performance of cooling tower decking without actual testing.

Immediate objective is to measure tower performance, using countless arrangements and construction materials, and to determine performance characteristics of different deck fillings. Tower 50' high and 6' square is used for experiments. Water concentrations ranging from ½ to 10 gpm/sq ft are handled.

Engineers are able to apply heat loads in excess of 10 million Btu/hr. Air system is on automatic electronic control for both air wet bulb and dry bulb temperatures. Controlled air inlets enable laboratory to test 80°F wet bulb in winter. Humidity is provided with steam.

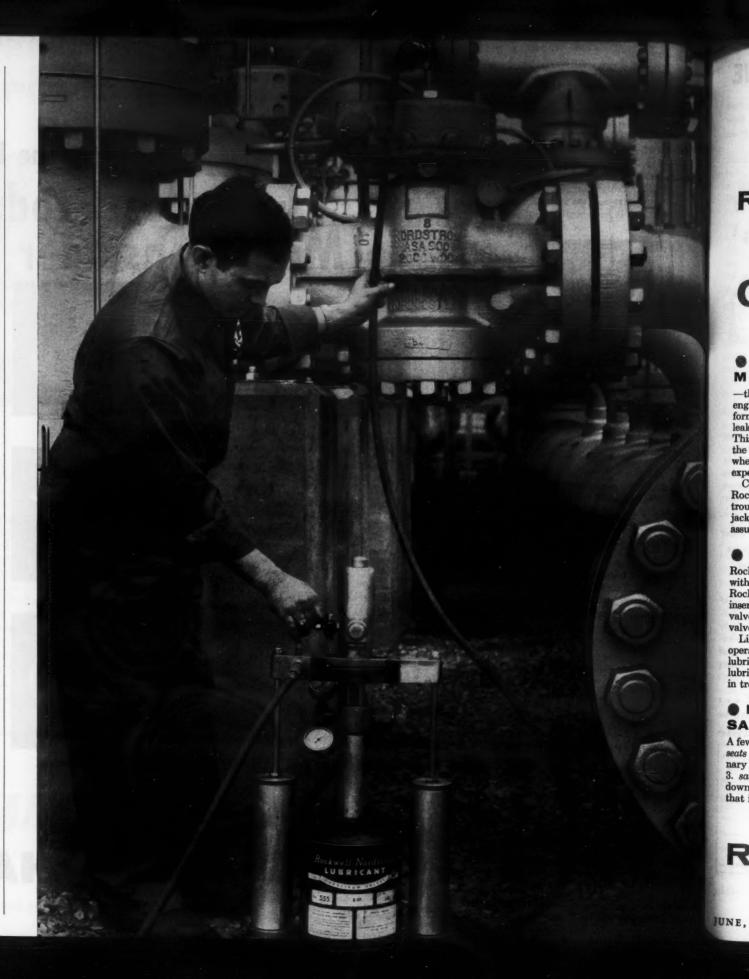
Dry bulb is controlled with a finned tube air heating coil. Water temperature to tower is also automatically controlled Water flow is measured with series of calibrated orifices, with an accuracy of 1%. Air flow is metered with pitot tube, used in conjunction with a variety of orifice plates.

(Cooling tower laboratory is operated by J. F. Pritchard and Company, Dept. CP, 4625 Roanoke Parkway, Kansas City, Mo.)

## Glass made scratch-proof by silicone solution . . .

coating resists steam, caustic

Water-dilutable silicone solution imparts scratch-resistance to glass, porcelain, and china. Supplied as a 20% solution in tertiary butanol, it can be diluted and applied by dipping, flooding, or spraying with



# Rockwell-Nordstrom Valves Prove Lubrication Is The Cheapest Maintenance!

#### LUBRICATION ELIMINATES METAL-TO-METAL FRICTION

—the major source of valve wear. As in your automobile engine, lubrication assures longer life and better performance. Pressurized lubricant also forms a remarkably leakproof seal between the plug and the valve body. This lubricant seal has proven far more effective than the uncertain metal-to-metal seal in ordinary valves where a tiny scratch means leakage . . . and eventually, expensive reseating.

Costly valve down time is practically eliminated with Rockwell-Nordstrom valves because lubrication stops trouble before it starts. The lubricant also hydraulically jacks the plug to eliminate stuck or jammed valves, assures instant, quarter turn operation.

#### **■ LUBRICATION IS FAST...EASY**

Rockwell-Nordstrom valves can be lubricated either with a pressure gun directly through the standard Rockwell fitting or by unscrewing the fitting and inserting lubricant "sticks." Lubrication never requires valve down time because any Rockwell-Nordstrom valve can be lubricated under service pressure.

Like any lubricated mechanism, frequency of use and operating conditions are the determining factors in the lubrication schedule. In any case, the time it takes to lubricate a Rockwell-Nordstrom valve is an investment in trouble-free, long-life valve service.

# LUBRICATION PENNIES SAVE MAINTENANCE DOLLARS

A few cents worth of lubricant buys three things: 1. new seats (renewing the lubricant is like reseating an ordinary valve)... 2. smooth, dependable operation and ... 3. savings in terms of lower repair, replacement and down time expenses. It is not the cost of the lubricant that is important, but the savings through longer, more

dependable life of the working parts and better performance.

#### • GENUINE ROCKWELL-NORDSTROM LUBRICANTS are

specially compounded to not only reduce friction, but also to create a positive, leakproof seal. They are the result of 40 years of production "know-how" and field testing by the pioneer lubricated plug valve manufacturer. Their sole purpose is to insure that Rockwell-Nordstrom valves give you the best valve service you've ever had. That's why it's good business to use only genuine Rockwell-Nordstrom lubricants in Rockwell-Nordstrom valves.

#### **■ 40 YEARS OF PERFORMANCE**

**PROVE** that Rockwell-Nordstrom valves are the most economical valves you can buy for *any* service. Over the years, the sale of repair parts has been less than one-half of one per cent of Rockwell-Nordstrom valve total valve sales . . . for every two dollars users spend on Rockwell-Nordstrom valves, they spend less than one penny for repairs.

Whatever your needs, there is a Rockwell-Nordstrom valve that will do the job with more trouble-free dependability and at lower cost per year than any other valve you've ever used. And the first cost of Rockwell-Nordstrom valves is no more (and often less) than the cost of ordinary valves! For more information, write: Rockwell Manufacturing Company, Pittsburgh 8, Pa.

Canadian Valve Licensee: Peacock Brothers Limited

# **ROCKWELL-Nordstrom VALVES**

LUBRICANT SEALED FOR POSITIVE SHUT-OFF



conventional equipment. Optimum properties are developed by airdrying at room temp for 24 hr, or by curing for 10 min at 100°C.

Solution is effective in concentrations as low as 0.01%. Diluted with hard or soft water, it remains stable for as long as 72 hours. Cured film is not affected by two-hour exposure to live steam, perchlorethylene, or 3% sodium hydroxide. Indications are that film is insoluble and will not contaminate foods. Treated surfaces may be labeled with many resin-type inks and certain adhesives.

(F-4141 silicone solution is development of Dow Corning Corporation, Dept. CP, 592 Saginaw Road, Midland, Mich. Check CP 7258 opposite last page.)

# Corrosive CS<sub>2</sub> handled easily by vertical sump pump . . .

mounted on top of outdoor tank, pumps liquid about 350'

Vertical sump pump, mounted on top of storage tank, transfers carbon disulfide from tank to process at the General Mills O-Cel-O Division plant, Tonawanda, New York. Installed over three years ago, pump moves the corrosive liquid about 350 feet. It is used intermittently throughout day.

Though protected from the elements only by a partial roof, which covers storage area, pump continues to give good service in rain, snow, sleet, and heat. Company uses carbon disulfide as a raw material for making viscose— an intermediate in the manufacture of cellulose sponges and other cellulose products.

(Vertical pump is product of The Deming Company, Dept. CP, 522 Broadway, Salem, Ohio. Check CP 7259 opposite last page.)

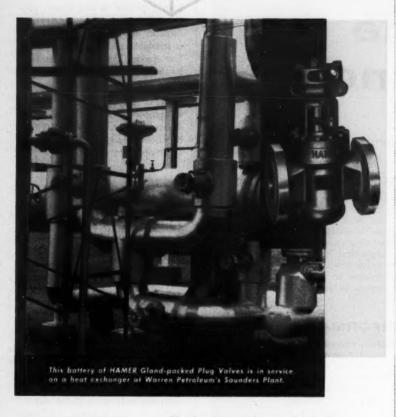


For more information on product at left, specify CP 7260 . . . see information request blank opposite last page.

# You can repack

### HAMER G. P. PLUG VALVES

## under full operating conditions



**HAMER Line Blind Valves** 

Built for strength and durability, Hamer Line Blind Valves are the modern means of blinding pipe lines quickly and effectively. A one man, one-minute operation. Cuts



Shutting down to change valve packings costs dearly in time and money. That's why Warren Petroleum uses Hamer gland-packed Plug Valves. Not only can Hamer glandpacked plug valves be repacked under full operating conditions, but because of the exclusive plug adjusting nut, a feature of all Hamer Plug Valves, the valves can't stick or freeze. No matter what the time lapse or service you have positive E-Z turn control at all times.

Send for FREE Catalog

#### VALVES, INC.

2919 Gardenia Ave., Long Beach 6, Calif. Representatives throughout the World

When inquiring check CP 7261 opposite last page

NEW SOLUTIONS of processing problems

Set the timer dial to total gallons of product; additive components are proportioned automatically . . .

> unit has given over a year's trouble-free service in bulk plant of midwest oil refiner

With increased attention being focused on gasoline and fuel oil additives, and with different requirements of different areas, a midwest petroleum refiner puts certain of its additive components into products at the terminal or bulk distributing plant. A simple-to-operate, accurate, and versatile method was needed.

About a year ago, a Milton Roy proportioning pump, controlled by an AB20A6 Manuflex timer, was installed at the truck loading racks.

This timer is turned on manually by the operator, runs a predetermined length of time, and then stops automatically. Its switch is single pole, double throw.

Dial and pointer of the timer are calibrated in gallons of product, and proper amount of component is proportioned automatically. For example - if a

tank truck is being filled with 5000 gallons of premium gasoline, timer pointer is set at 5000 on the dial. Switch is turned on. Timer governs constantflow pump, and proper amount of component is squirted into product loading line, which has constant-rate flow. A coupling mechanism interrupts timer if flow is temporar-



to number of gallons loading on truck, automatically governs amount of component added

Timer has a stop

ily stopped.

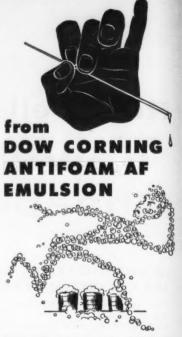
lever for accurately repeating a given time setting. A "hold" feature permits untimed operation, if ever needed.

Performance has been very satisfactory, Results: with no maintenance problems arising. Unit is checked every two weeks as to volume of output, and no variations have been found to date. Timer has sealed-in lubrication and requires no maintenance. Pump and reducer are lubricated at twoweek intervals.

Power to the pump is supplied by a 1/4-hp motor with a 24:1 Winsmith gear reducer. All equipment is explosion-proof.

(Manuflex timer is a product of Eagle Signal Corp., Dept. CP, 200 20th St., Moline, Ill. . . . or for more information check CP 7262 on convenient Reader Service slip which is located opposite last page.)

FOAM'S a FUGITIVE



Given a chance, a Dow Corning silicone defoamer almost always gets its man... restores productive capacity previously wasted on foam . . . reduces processing time . . . eliminates hazardous boil-overs ... and at very low cost. For example:

- 12 ppm defoam cottonseed oil
- 4 ppm defoam fermenting wheat
- 4 ppm defoam neoprene latex
- 4 ppm defoam paper sizing
- .07 ppm defoam vat dies

The more easily dispersed Antifoam AF Emulsion and its parent product, Antifoam A Compound, are physiologically harmless. Effective at low concentrations against the widest variety of foamers, they pay for themselves many times over.

#### see for yourself . . .

mail coupon today for

SILICONES Dow Corning Corporation

free sample

Midland, Mich., Dept. 3206

Please	send	me dat	a and tre	e .sc	mpie	OI
Do	w Cor	ning Anti	foam A Co	mpo	und	
or 🗌	Dow	Corning	Antifoam	AF	Emuls	on
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ZONE STATE

When inquiring check CP 7263 opposite last page

CHEMICAL PROCESSING

Salt outpu with hot-c on dryer

being dried at The Wes Ithaca, Nev to the unit and then e force that a pulverized i had to be Besides dec

premium sa 50% highe ventional maintenance unit going. was lost three emplo chipped off Solution:

supply cure Company r tube and h up with a fired, hot-air is such that er in intim tumbling salt without dam

Air velocity by-pass in t shunts part back into in reheating r temperature to dryer. 7

considerably. grade salt 1 Heater remo moisture per much salt in formerly p Maintenance considerably.

(Counterflo is product tion, Dept. Building, Pitt CP 7264 opp

For more infor uct at right, blank opposite Salt output boosted 100% with hot-air heater on dryer

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Problem: Premium-grade salt being dried in rotary kiln dryer at The West Shore Salt Company, Ithaca, New York, would adhere to the unit's direct-fired oil tube and then explode off with such force that a high percentage was pulverized into small crystals that had to be sold as common-grade salt.

Besides decreasing the output of premium salt (which commands 50% higher price than the conventional brand), considerable maintenance was required to keep unit going. An hour's production was lost each morning while three employes entered dryer and chipped off the adhering salt.

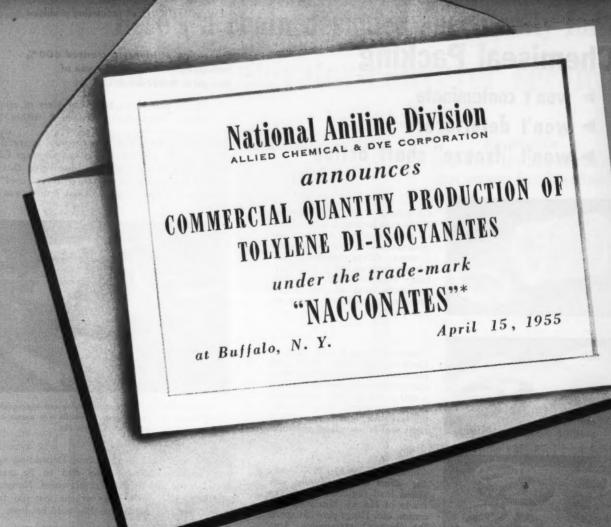
Solution: A change in heat supply cured all these headaches. Company ripped out the heater tube and had the dryer hooked up with a two-million-Btu, oil-fired, hot-air heater. Arrangement is such that air flows through dryer in intimate contact with the tumbling salt, carrying off moisture without damaging crystals.

Air velocity is kept low by a by-pass in the duct work which shunts part of heater discharge back into inlet. Recirculation and reheating raises discharge air temperature to 250°F for delivery to dryer. This cuts fuel costs considerably.

Results: Output of premiumgrade salt has increased 100%. Heater removes about 1500 lb of moisture per day to produce as much salt in three days as that formerly produced in seven. Maintenance has been reduced considerably.

(Counterflo heater used in dryer is product of Dravo Corporation, Dept. CP, 1203 Dravo Building, Pittsburgh 22, Pa. Check CP 7264 opposite last page.)

For more information on product at right, specify CP 7265
. . . see information request blank opposite last page.



Now available for immediate delivery in commercial quantities from Buffalo, N. Y., subject to prior sale:

National NACCONATE 80 Isomeric mixture of 80% 2, 4-tolylene di-isocyanate and 20% 2, 6-tolylene di-isocyanate

Also available for commercial development work:

National NACCONATE 65 Isomeric mixture of 65% 2, 4-tolylene di-isocyanate and 35% 2, 6-tolylene di-isocyanate

National NACCONATE 100 2, 4-tolylene di-isocyanate

National NACCONATE 200 3, 3' bitolylene 4, 4'di-isocyanate

National NACCONATE 300 Diphenylmethane 4, 4 di-isocyanate

We invite inquiries for samples, technical data and quotations.

Watch the editorial and advertising pages of this publication for additional information on National NACCONATES



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ALLIED CHEMICAL & DYC CORPORATION
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Boston Providence Philadolphia Chicago San Francisco Portland, Orc. Greensbero Cheriotto Bichmond Atlanta Los Angolus Columbus, Ga. New Orleans Chattanooga Toronto

# Chemiseal Packing

- won't contaminate
- won't deteriorate
- won't "freeze" shaft action



V-TYPE PACKING

Chemiseal Type 810 TEFLON V-Packing for use in manual, air or motor operated valves. Construction and distinctive tapered. V design offers chemically impervious service and greater flexibility and resiliency, providing necessary seal at low gland pressure and reduced torque on valve stem.



CUP AND CONE TYPE PACKING

Chemiseal Type 810-W TEFLON Packing for both hand and mechanically operated valves. Cones deform inwardly to effect a seal at the spindle, while cups expand outwardly against stuffing box wall, making possible a tight seal at low gland pressure.



WEDGE TYPE PACKING

Chemical Type 810-WX Packing offers the unusually low gland load required for valves made of Haveg, Karbate, ceramics, etc. Rings provide space for thermal expansion. Also adaptable for spring loading wherever exceptionally low friction load is required.



PUMP PACKING

Order Chemiseal Types 711-G, (graphite, impregnated) No. 711-M, (impregnated with mica) and No. 711-O (pure Teflon). For general purpose or noncontaminating pump service throughout the processing industries.

► Write for Catalog Number TP-1053.

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Representatives in principal cities throughout the world

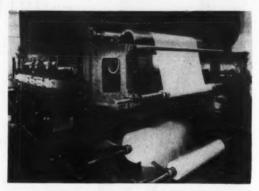
When inquiring check CP 7266 opposite last page

NEW SOLUTIONS of processing problems

Operating efficiency increased 600% in impregnation plant by use of five-pass tower-oven . . .

fabrics pass through unit at rates of 60-900 yd/hr, temperatures controlled within 2°F

Problem: While searching for ways to speed up its operations, Narmco Resins and Coatings Company, Costa Mesa, California, discovered that its original single-pass impregnating tower (used for impregnating fabrics with various resins) was the



View of take-off end of vertical drying and impregnating tower. Unit is designed to handle five passes of cloth during single run

biggest bottleneck in the plant. Depending upon specifications, fabrics often had to be passed through the unit as much as five times. Numerous windings and unwindings of the material from rollers was required before this could be done.

Not only did this procedure delay production, but the excess handling also increased risk of damage to product. The coatings are very sensitive to moisture and temperature variations during this phase of the process.

Company manufactures resin-impregnated fabrics, high-strength structural adhesives, and supported adhesive films for aircraft, other applications.

Solution: Plant installed a new tower capable of handling five passes of cloth at one time (one dry and four solution passes). Each of the four passes moves through its own individual dipping tank, making possible the application of different resins during the same run. Unit measures 33' high,  $6\frac{1}{2}$ ' wide, and 12' long.

Tower has 2-million-Btu gas-heated oven. Air circulation is provided by 16,000-cfm blower. Temperatures can be varied from 130 to 660°F, with two degree accuracy. Automatic recording instruments keep permanent log of temperatures.

Variable-speed drive shaft (made by John Waldron Corporation, New Brunswick, N. J.) permits fabrics to pass through tower at rates of 60 to 900 yards per hour.



FEATURE CONTROLLED CHEMICAL COMPOSITION

... so you get better and easier control during processing . . . plus a better, more uniform end product.

#### SPECIFY EL DORADO FOR

- · PURITY
- SERVICE
- UNIFORMITY

El Dorado has specialized in coconut oil products for more than half a century. That's one big reason why you can depend on the performance of El Dorado products in your formulations.

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For samples and specifications, write Dept. P.

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OIL WORKS

Main office: P. O. Box 599, Oakland 4, Calif. Plants: Bayonne, N. J., Oakland, Calif.

When inquiring check CP 7267 opposite last page

CHEMICAL PROCESSING

(JCM77)

PAGRA Drawi

Automat and feed Teflon-co ing of co tures du tinguishin

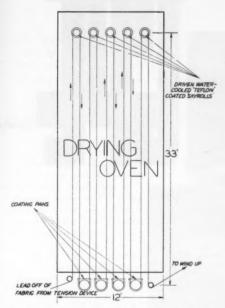
Results: improved new coat ture cont coated p tinuous and unw

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CP 7268 (Turn to ticle tellin against fire

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Drawing shows roller and dipping-pan arrangements

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Automatic tension device regulates fabric strain and feeds web through rollers. Upper rolls are Teflon-coated and water-cooled to prevent blocking of coated fabrics to the rolls. Tower also features dual-windup system and automatic fire-extinguishing, explosive-condition detecting devices.

Results: Quality control and productivity have improved significantly with the installation of the new coating facilities. As result of close temperature control and other benefits, tensile strength of coated products has increased 10 per cent. Continuous impregnating, without need for winding and unwinding, has increased operating efficiency 600 per cent.

(Impregnating tower is product of J. O. Ross Engineering Corporation, Dept. CP, 444 Madison Avenue, New York 22, New York . . . or check CP 7268 on handy form opposite last page.)

(Turn to page 130, the start of our Safety section, for article telling how Narmco protects its impregnating tower against fire.)

# New solutions of corrosion problems in July CP

If you have corrosion problems, be sure to see the July issue of CHEMICAL PROCESSING, which will feature Corrosion Control. Among other articles will be case history stories telling how plants have stopped corrosion.

# Here's a chain designed specifically for abrasive elevator-conveyor service



# It's long-life LINK-BELT Ley bushed chain that assures less downtime

If you're handling abrasive materials, you'll appreciate the extra wear Link-Belt builds into its Ley bushed chain. The barrels of this rugged cast chain have renewable hardened steel bushings in which steel pins ride. For extraordinarily severe service, manganese steel bushings and alloy steel pins can be furnished.

The design and manufacturing refinements that go into the Ley bushed line are typical of the care that Link-Belt gives to every detail of every chain. And, because Link-Belt builds a complete line, you're sure to get the one best-suited to your exact requirements. Ask your Link-Belt representative or distributor for all the facts on Link-Belt chains and sprockets today.

# No ONE chain serves every purpose — get the RIGHT one from LINK-BELT's complete line



LXS chains are made to close tolerances from carefully selected steels. Ideal for rugged drive and conveyor service.



Class C combination chain —popular, durable, low-cost design for elevators and conveyors.



Class SS bushed roller chain with straight sidebars—for practically any conveyor or elevator.



Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

# LINK BELT

**CHAINS & SPROCKETS** 

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check CP 7269 opposite last page

## Custom casting service for plastics . . .

enables companies to evaluate products at minimum cost

Custom plastics casting service enables companies to evaluate their contemplated products without actually having to go into production. Service is analogous to metal foundry shop operations for preparation of casting for many applications.

Finished parts are produced to customers' specifications using modified injection molding technique. Molds are said to be expendable and inexpensive. Multi-component resin mixes such as ethoxylenes, polysulfides, polyamides, foamed phenolics, or polyurethanes may be specified.

(Plastics casting service is offered by Applied Engineering Associates, Dept. CP, 1952 Flushing Avenue, Brooklyn 37, New York . . . or for more information concerning company's service, reader may simply check CP 7270 on handy form which is located opp. last page.)

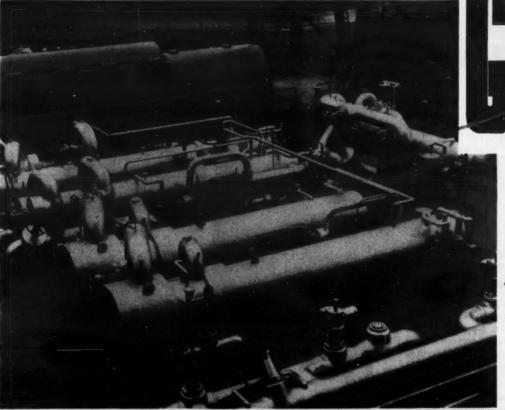
# Use black light to assure 100% nylon coverage on fuel cell walls...

areas which are not covered are spotted easily

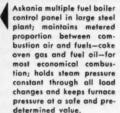
Black light is used as an inspection and production tool to insure complete nylon coverage on fuel cells produced at Firestone Tire and Rubber Company, Los Angeles, California. The nylon coating serves as a barrier to dispersion of aromatic fuels through the cell walls. Black-light method assures 100% coverage in each case.

In the process, a minute quantity of fluorescent additive (less than 1%) is added to the liquid nylon used for the first coat. Application is performed under black light so operator can spot areas not covered. Non-fluorescent nylon is used for the second coat.

One of a series telling how the producing companies of General Precision Equipment Corporation are contributing to America's progress.



Griscom-Russell feed water heaters in a 125,000 KW public-utility power station; save nearly 100 tons of coal per day. Heaters handle flow of water exceeding 2000 G.P.M. at 2500 pounds pressure and steam extracted from the turbine at five different points; "train" of five units preheats water fed to boilers from 90° F. to 441° F.







General Precision Laboratory's Industrial TV Camera, the "Bullet"; portable, easily operated; used to monitor and improve manufacturing processes and to view hazardous industrial operations. Pro

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JUNE, 19

The highly advanced technological products designed and manufactured by the eighteen producing companies of General Precision Equipment Corporation serve more than a dozen major industries. Products of six of these GPE Companies—Griscom-Russell, Askania, Librascope, Link, Kearfott and General Precision Laboratory—have widespread application in the processing and power industries.

## Industrial Processing...and Power

The Griscom-Russell Company is one of the country's largest producers in the fields of heat exchange and water distillation. It is the pioneer in heat exchanger equipment—the key to the whole complex of modern industrial processing and power. For over seventy years, G-R equipment has been responsible for greatly increased efficiency and lowered operating costs in industry.

Askania Regulator Company for a quarter of a century has been a leading developer in the field of regulators and controls, including components and systems. Its products are widely used by the power, steel, gas and coke, mining, chemical, petroleum, glass and paper industries—wherever great reliability and accuracy are essential.

Kearfott Company, Inc.; Librascope, Incorporated; and Link Aviation, Inc. produce a wide variety of precision instruments, computers, servos and other control components for equipment and systems used throughout the power and the processing industries. Industrial television equipment manufactured by General Precision Laboratory Incorporated, the sixth GPE Company active in these fields, is playing increasingly important roles in "seeing eye" monitoring operations in these industries.

Each company in the GPE Group works in specific, highly specialized technical areas, as indicated in the

chart below. Each of these companies, in addition to specializing in its particular products and fields of technical competence, has at its command, as required, the facilities and specialized techniques of the other GPE Companies in their respective fields. Interrelation is achieved through GPE's basic operating policy, Coordinated Precision Technology.

In the fields of research and development, GPE Coordinated Precision Technology permits a high degree of specialization in particular areas of competence and supplements such specialization by the application of techniques in other fields, as desirable. In the field of production, it makes possible a highly flexible application of facilities. This policy has been responsible for a diversified line of precision equipment of superior design and performance, covering a wide range of both standard and special uses.

Perhaps the most conspicuous advantage of GPE Coordinated Precision Technology is that the concept and development of equipment, and of solutions to the underlying technical problems, are not restricted or distorted by traditional allegiance to specialization in a particular field. GPE coordination permits the engineers and technical personnel of each GPE Company to seek the optimum solution for the customer within the total capacities of the GPE Companies as a group.

000	••	••		00	000	•	000	00	00	00	900	PRECISION MECHANICS, OPTICAL DEVICES, CERAMICS
000	•	•			900	000	00	•	00	•	000	ELECTRICAL EQUIPMENT and COMPONENTS
000	••	900	000		000	•	00		000	00	900	ELECTRONICS
	00			000					000			HYDRAULICS, LIQUIDS PROCESSING, HEAT EXCHANGE
•			900						•			TELEVISION Studio, Theatre, Educational, Business, Industrial
000		99			000	00	00		000		000	INSTRUMENTS, SERVOS, CONTROLS Hydraulic, Pneumatic, Magnetic, Electronic
000	•		000		000						900	AIRCRAFT and MISSILE GUIDANCE, CONTROL, SIMULA
000	•	•			000				000		000	AUTOMATIC COMPUTERS and COMPONENTS
000									•			RADAR, MICROWAVE, ULTRASONICS
	000						000	000		000		MOTION PICTURE and AUDIO EQUIPMENT
											000	NUCLEAR POWER COMPONENTS and CONTROLS
•••			000	000	000				000		000	SYSTEMS ENGINEERING Aeronautical, Naval, Industrial
COMPANY, INC.	INTERNATIONAL PROJECTOR CORPORATION	BLUDWORTH MARINE DIVISION	SENERAL PRECISION LABORATORY INCORPORATED	CRISCOM-RUSSELL COMPANY	LINK AVIATION, INC.	THE HERTNER ELECTRIC COMPANY	THE STRONG ELECTRIC CORPORATION	J. E. MCAULEY MFG. CO.	ASKANIA REGULATOR COMPANY	CORPORATION	LIBRASCOPE, INCORPORATED	THE GPE PRODUCING COMPANIES

A brochure relative to GPE Coordinated Precision Technology and the work of the GPE Companies is available. Address your request, or inquiries on specific problems, to:

#### General Precision Equipment Corporation

92 GOLD STREET, NEW YORK 38, NEW YORK

Any fluorescence remaining indicates lack of coverage.

Formerly, a visible dye was used with the nylon. Dye, however, affected efficiency of the nylon, and even three coats did not guarantee complete coverage. Firestone reports that only one inspector is now required for every three production workers. Formerly, one inspector was needed for each operator. Lights can be used under normal factory lighting conditions. Workers report no eyestrain or fatigue.

(Black lights were installed by Ultra-Violet Products, Inc., Dept. CP, 145 Pasadena Avenue, South Pasadena, California . . . or for more information concerning manufacturer's product, reader may simply check CP 7271 on handy Reader Service slip which is located opposite last page.)

#### Fluid petroleum coke successfully used as fuel

Fluid petroleum coke has been successfully used as fuel for kiln firing at Permanente Cement Company, Permanente, California. Normal production operations were neither interrupted nor reduced when the fluid coke was injected into fuel system of the large western company.

Fluid coke is a petroleum product resulting from a refining process which converts low-value, heavy residual oils into lighter oils. Product is substantially all carbon and has the consistency of sand. Coke-producing process was developed by Esso Research and Engineering Company.

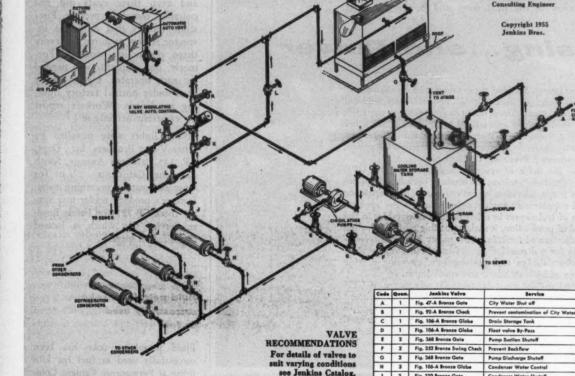
(Fuel test was conducted by Kaiser Engineers, Division of Henry J. Kaiser Company, Dept. CP, 1924 Broadway, Oakland, California.)



For more information on product at left, specify CP 7272
. . . see information request blank opposite last page.

### JENKINS PRACTICAL PIPING LAYOUTS





#### How to plan piping connections for SPACE HEATING WITH HOT WATER DISCHARGE FROM REFRIGERATION CONDENSERS

Where continuous refrigeration is required, the heat absorbed by the water circulating through the condensers during the refrigeration cycle may be transferred to circulating air and used for space heating. This hookup illustrates a system that is widely approved for utilizing waste heat in frozen food plants, ice cream plants, supermarkets, and refrigerated warehouses.

A cooling tower for water conservation is included in the usual water cooling system for refrigeration condensers, as indicated. All or a portion of the water which usually flows through the cooling tower system may be diverted and circulated instead through a water coil in the summer air conditioning unit. A three way modulating valve, actuated by a room thermostat, controls the

water passing through the two parallel circuits, dividing it according to the heating requirements.

Excess heat, when all the heat is not required, is removed by regulating the amount of the water circulated through the parallel path of the cooling tower. Additional heat may be provided, when needed, from any other customary source.

The cooling tower circuit provides for water storage in a tank inside the building to avoid freeze-ups. The water circuits shown can be full weight red brass pipe, copper tubing, or black iron pipe.

This combination of refrigeration and heating is an adaption of the heat pump cycle and will provide both refrigeration and heat for minimum operating costs.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

Vent Control

3 Fig. 105-A Bronze Glob

3 Fig. 370 Bronze Gate

3 Fig. 348 Bronze Gate 2 Fig. 106-A Bronze Globe

1 Fig. 106-A Bronze Globe

1 Fig. 106-A Bronze Globe

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of lowest cost in the long run. Jenkins Bros., 100 Park Ave., New York 17.

COMPLETE DESCRIPTION AND ENLARGED DIAGRAM OF THIS LAYOUT FREE ON RE-QUEST. Includes additional detailed information. Ask for Piping Layout No. 75.



SOLD THROUGH PLUMBING - HEATING AND INDUSTRIAL DISTRIBUTORS

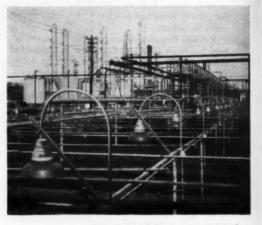
NEW SOLUTIONS of processing problems

**Explosion-proof lighting units** help protect nerve center of Shell refinery . . .

> vented fixtures reduce possibility of fire in main oil pump house

Problem: In the main oil pump house of a refinery, many gasoline and light hydrocarbon streams meet. If a line should break or a gasket give way, it could be extremely hazardous and potentially costly. A fire here could shut down an entire refinery. Since this has happened at other companies, Shell wanted to reduce this possibility to a minimum at its Pasadena, Texas refinery.

Among other safety measures, in-



General area explosion-proof lighting over main oil pump house manifold pit at Shell. Note excellent condition of fixtures in spite of two years service in corrosive salt air

cluding large portable CO2 fire extinguishers, Shell installed vented explosion-proof lighting fixtures in the pump house area about two years

The lighting fixtures, shown in accompanying photographs, meet all Underwriters' Laboratories requirements for Class I, Groups C & D Hazardous Locations. This includes atmospheres containing gasoline, alcohol, acetone, benzene, natural gas, ethylene, cyclopropane, and other similar materials.

Fixtures are designed so that five full threads confine any arcing, even if current is accidentally left on while servicing unit.

Another interesting feature of the fixtures which helps minimize maintenance and avoid production delays is the speed of relamping. Unit is designed so that entire fixture can be removed and a stand-by unit installed in less than one minute. Fixture that had been in use can then be serviced at the bench.

Units are designed, fabricated, and coated to withstand the corrosive salt air of the Gulf Coast area. Exterior of dome assembly is zinc plated over steel

and then and guar coated or and on edge of condensat

Interior

Results: outside o factorily :

fire. As sh excellent of the corros (Series A. product of 59 Wellin more infor

Solid nic for ship partment tive inter gen blov (Truck is vision, A

CP, Mon

and then sprayed with aluminum. Interior of dome and guard are made of aluminum. Steel reflector is coated on outside with green baked porcelain enamel and on interior with white enamel. Entire lower edge of hood is vented to avoid build-up of condensation on interiors.

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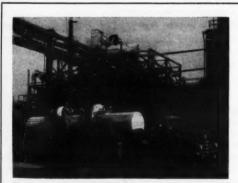
steel



Interior explosion-proof lighting in main oil pump house. Two portable CO<sub>2</sub> fire extinguishers shown remain in designated locations, readily available

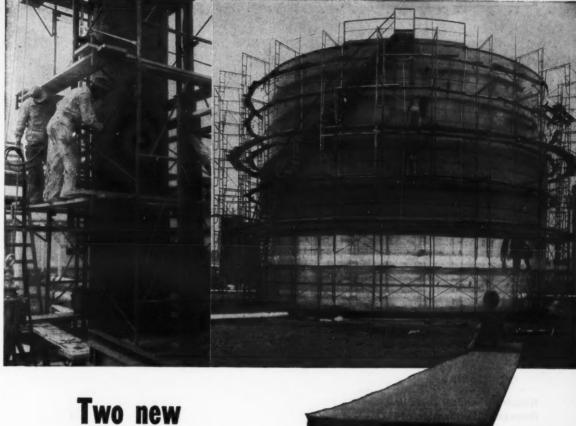
Results: Lighting units inside pump house and outside over manifold pit have functioned satisfactorily and helped to reduce the possibility of fire. As shown in photographs, fixtures are still in excellent condition in spite of two years service in the corrosive salt air.

(Series AA-51 explosion-proof lighting units are product of Appleton Electric Co., Dept. CP, 1701-59 Wellington Ave., Chicago 13, Ill. . . . or for more information check CP 7276 opposite last page.)



Solid nickel tank truck is used by Monsanto for shipping benzyl chloride. The two-compartment tank holds 2185 gal of the sensitive intermediate, and is unloaded by a nitrogen blowing system.

(Truck is in service at Organic Chemicals Division, Monsanto Chemical Company, Dept. CP, Monsanto, Illinois.)



techniques revolutionize the insulation of tanks, vats and vessels...

... and both of these new low-cost methods involve the use of ULTRALITE\*, the long fine glass fiber insulation.

For large storage tanks, the most economical method is to cut long strips of ULTRALITE, run them around the tank (or from top to bottom) and cover with metal jacketing. On smaller vessels, like the fractionating column pictured, the common practice is to wrap with ULTRALITE, apply a mesh screen, and spray with weatherproofing materials.

Either of these ULTRALITE methods requires only a fraction of the time that would be spent in cutting, fitting and applying rigid segmental blocks or bats. Once applied, there will be no cracking of the insulation when expansion and contraction take place, for ULTRALITE is flexible and resilient. Best of all, your insulation is permanent, for ULTRALITE is as enduring as glass itself.

Like to receive complete details on these methods that will save you a good deal of time and money on that next insulating job? Just write today—or better yet, call your local ULTRALITE distributor in any of 57 cities. You'll find him listed in the Yellow Pages under "Gustin-Bacon Insulations."

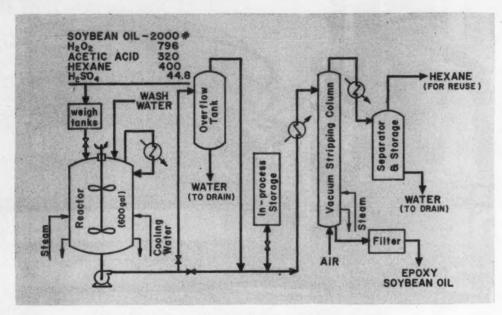
\*Reg. U.S. Pat. Off.



hermal and acoustical glass fiber insulations • Pipe Couplings and fittings • Railroad gaskets and supplies

254 W. 10th St., Kunsus City, Mo.

When inquiring check CP 7277 opposite last page



Flow Sheet for In Situ Epoxidation of Soybean Oil

Keeping chemical costs low through full utilization of H<sub>2</sub>O<sub>2</sub> ---

# in situ epoxidation process gives 75-90% conversion to epoxide

# Formed-in-place peracid allows 22 % greater active-oxygen utilization

In situ epoxidation process described here gives a 75-90% conversion to epoxide, with almost quantitative reaction of the double bond. Chemical costs are low — in the range of 11.9c/lb for polyunsaturated triglycerides such as soybean oil, and 6½c/lb for monohydric alcohol ester of oleic acid.

Epoxide reactions are utilized by manufacturers of insecticides, plasticizers, pharmaceuticals, lubricants, and resins for making both intermediates and directly-consumed compounds. The *in situ* procedures are of particular appeal because of their lower chemical costs and higher oxygen utilization. They provide continuous formation of peracid and utilization of it in the reactor (*ie: in situ*). This eliminates buffering by mineral acid, which reduces by fully 22% the original active-oxygen content of the acid when it is not formed in place.

The in situ epoxidation process described here

utilizes a controlled molar ratio (0.5:1.0 of acetic acid to  $H_2O_2$ ) at a 60-70°C temp, in presence of a strong acid catalyst, giving optimum conversion. Not only is complete utilization of active-oxygen accomplished, but also there is a marked reduction in acetic acid requirements. Using preformed peracetic acid, the molar ratio was 1.69:1.0 of peracetic acid to  $H_2O_2$ .

Catalyst choice is flexible. Sulfuric acid, alkane sulfonic acid, or strong acid cation exchange resins may be used depending upon raw material and processing facilities available. Ion exchange resins are good for epoxidation of polyunsaturated materials, but show no particular advantage for monounsaturated esters. By addition of a filtration step, resin catalyst can be used a number of times.

(In situ epoxidation method is a process developed by Becco Chemical Division, Food Machinery & Chemical Corp., Dept. CP, Station B, Buffalo 7 N.Y. . . . or for more information check CP 7278 on handy form opposite last page.)

# Procedure for In Situ Expoxidation of Soybean Oil

(Almost quantitive yields of an epoxidized oil, containing 75-90% epoxy ester, are obtained)

- 1. Charge soybean oil to reactor.
- Start agitation. Warm to 50°C using steam jacket.
- Add hexane, acetic acid, and sulfuric acid in that order.
- When temp reaches 50°C, shut off steam. Circulate cooling water through coils.
- Add slowly the 50% H<sub>2</sub>O<sub>2</sub> (through a constricted orifice) over a 2 hr period. Keep temp at 50-60°C.
- When all H<sub>2</sub>O<sub>2</sub> is added, throttle cooling water and allow temp to rise to 60°C.
- Keep temp at 60-65°C until reaction is complete, as shown by titration for residual H<sub>2</sub>O<sub>2</sub>.
- 8. Stop agitation and allow a 20-min settle.
- 9. Pump lower aq. layer to overflow tank.
- Add 150 gal water at 40-50°C to reacted oil; agitate for 5 min at 40-50°C.
- 11. Allow a 20-min settle.
- 12. Pump lower aq. layer to overflow tank.
- 13. Repeat steps 10 through 12 until 5 warm water washes have been made.
- Pump washed crude to vacuum stripping column. Remove solvent and traces of water at 15 mm and 50-60°C.
- 15. Draw off product and filter it.
- 16. Pump to storage, or drum.



#### Notes on Process

- Weigh tank valves are electro-pneumatic with interlocks to force sequence operation after agitation is on.
- ) Valve for H<sub>2</sub>O<sub>2</sub> has constricted orifice for controlled addition.
- c) All tanks are vented.
- d) Weigh tanks are made of aluminum (except H<sub>2</sub>SO<sub>4</sub>, which is glass-lined) and equipped with electric probe for pump shutoff.
- e) Reactor is equipped with 8-psi rupture disc and emergency flooding line.
- f) A water pan is under H2O2 measuring tank.
- g) Reactor, overflow tank, stripping column, heat exchangers, storage tanks, pumps, and piping are 300-series stainless steel.

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Uses:

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Descriptio

Sp gr Bulk dens pH of I CaCO<sub>3</sub>-co Initial Fe value

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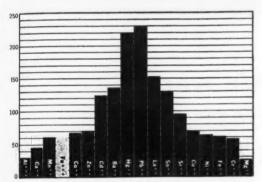
JUNE, 195

# Chelating power for Fe\*\*\* is high over entire pH range

Agent also features strong Ca", Mg" sequestration, and forms 1:1 molar chelates with most other metals

Uses: In textile, cosmetic, pharmaceutical, agricultural, and general industrial use as sequestering agents for polyvalent ions of many metals.

Features: Chelating power for ferric ion is high over the entire pH range. In the range 7 to 11 values are four or more times greater than ethylene



Gm of metal ion chelated per 1000 gm liquid agent

diamine tetra acetic acid. Agent also features strong calcium and magnesium sequestration, and forms 1:1 molar chelates with most other metals. This results in a "balance of chelation" necessary to control water hardness with one product, even though large concentrations of Fe+++ are present.

Agent has relatively high solubility, especially in presence of acids. Stability is exceptional. Chelates are unaffected by most anions and organic compounds. Dyes that tend to form metal complexes are amply protected. Of common precipitating agents, only sulfide ion will remove metal.

Description: Perma Kleer-80 is supplied as a 47% liquid and as a 95% spray-dried bead. Specs:

	Liquid	Bead
Sp gr	1.32	
Bulk density		0.5
pH of 1% solution	11-12	11-12
CaCO <sub>3</sub> -complexing value (mg/gm) Initial Fe <sup>+++</sup> -complexing	120	215
value (mg/gm) @ pH 7	108	210
@ pH 11	44	88

Agents are completely soluble in water, and acid and alkaline solutions. About 167 gm of dry Perma Kleer-80 will dissolve in 100 gm of water throughout entire pH range.

(Sequestering agents are products of Refined Products Corp., Dept. CP, 624 Schuyler Ave., Lyndhurst, N.J. Check CP 7279 opposite last page.)

#### ONLY CARBIDE PRODUCES ALL THREE

You can order any one or all three of these low-boiling alcohols from Carbide. They are available in various specification grades to suit your requirements. Carbide's 25 years of experience in producing synthetic alcohols assures you of high-purity products. Tank-car and tank-truck shipments are readily made. Prompt LCL deliveries of most grades can be made from 50 warehouses in important industrial areas.

# WHENEVER YOU NEED AN ALCOHOL...

... check with CARBIDE — producers of 16 other synthetic alcohols. From this wide choice, you will be able to select the alcohol that has the combination of physical properties to solve your problem.

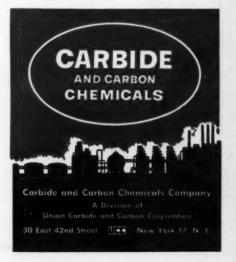
# methanol ethanol isopropanol

These alcohols are most widely used as solvents and intermediates for -

- \* Surface Coatings
- \* Resins
- \* Dyestuffs
- \* Pharmaceuticals
- \* Cosmetics

For Technical Assistance

Call the nearest Carbide office for technical service — representatives are located in 21 principal cities across the nation. For additional information on these alcohols — their applications, physical and chemical properties, specifications and shipping data — ask for the new family book, "Alcohols" (F-4731). In Canada: Carbide Chemicals Sales Company, Division of Union Carbide Canada Limited, Toronto.



When inquiring check CP 7280 opposite last page



# LITHIUM

#### . . . the Miracle Element

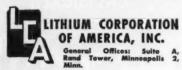
Lithium may hold for you the clue to a new or better process in your industry. Lithium anticipates the future: it awaits only a need—perhaps yours—for its properties. For lithium properties are unusual, sometimes paradoxical, and often uniquely valuable.

Lithium metal, for example, is lighter than magnesium or aluminum. It is extremely reactive, ductile, easily extruded and rolled, and readily melted or cast. The salts of lithium have low melting points. Analogous to both alkalies and alkaline earths, they too are highly reactive and form numerous low melting eutectics. These properties are stimulating to researchers, scientists and production-engineering men alike—properties that open the door to possibilities in countless fields of process chemistry and heretofore inaccessible areas of research.

Lithium has helped solve industrial processing, problems in organic chemicals, ceramics, air conditioning, petroleum greases, metallurgy, pharmaceuticals, brazing fluxes and atomic energy. It may well be just what you have been looking for to solve your production problem . . . with such added benefits as lower costs, improved performance, increased sales appeal and greater profits . . . accruing to you.

Investigate this wonder chemical. Write for Data Sheets on some 25 different products—metals, salts and special compounds. All are available in experimental or commercial quantities.

... trends abead in industrial applications for Lithium.



Mines

Black Hills, South Dakota; Bessemer City, North Carolina; Manitoba and Quebec.

Plant

St. Louis Park, Minn. and Bessemer City, North Carolina

materials

Purity (wt %, min)	95	Distillation range (°C @ 760 mm, 90% min)	100-103
Nitroparaffin content (wt %, min)	99	Odor	Mild
Sp gr (25/25°C)	1.124-1.129	Solubility in 100 ml water (ml @ 20°C)	9.5
Acidity as acetic acid (wt %, max)	0.1	Evaporation rate (butyl acetate = 100)	139
Water (wt %, max)	0.1	Flash point (Tag open cup, °F)	112
Color (APHA, max)	20	Ignition temp (°F)	785

# makes simple work of cutting cellulose acetate for lacquers

As little as 25% nitromethane gives a stock solution of 24 gm/100 ml at room temperature

Cellulose acetate finishes are impervious to ultraviolet light, have much lower flammability than nitrocellulose finishes, and can be applied on many surfaces upon which nitrocellulose cannot be used, such as on plastic articles. However, to obtain good flow, freedom from blush, and rapid drying and hardening characteristics, suitable solvents must be used. Heretofore these finishes have been based on a combination of very rapid and very slow evaporating solvents and many hours were required for the film to harden. In addition, cutting was a very slow and troublesome operation.

A class of solvents evaporating in the medium range was found in nitroparaffins. (See CHEMICAL PROCESSING Feb 1955, pp 42-43.) At first the nitropropanes were emphasized, but recently it has been found that nitromethane has several points of superiority.

Nitromethane is a true solvent for cellulose acetate, while nitropropanes must be used with alcohols. Nitromethane is much stronger than 1- and 2-nitropropane. Stock solutions of cellulose acetate require

as much as 60-65% nitropropane whereas as little as 25% nitromethane will give a stock solution of 24 gm/100 ml. Nitromethane has an added advantage over usual solvents in that no heat is required for solution. Nitromethane makes cutting a simple operation since it dissolves cellulose acetate readily in the cold.

Stock formula suggested for cutting:

	Vol%
Nitromethane	25
Ethyl alcohol	35
Toluol	40

Once cellulose acetate is dissolved, 1-nitropropane is almost as good a solvent as nitromethane. By incorporating it in the thinner, advantage can be taken of its slower evaporation rate. For thinning stock solution to spraying viscosity, this solvent mixture is recommended:

Nitromethane	7.5
1-Nitropropane	7.5
Ethyl alcohol	30
Butanol	10
Toluol	45

(Nitromethane for cellulose acetate laquers is a product of Commercial Solvents Corp., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information check CP 7281A on handy form opposite last page.)

When inquiring check CP 7281 opposite last page

CHEMICAL PROCESSING

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### Reacting with cellulose, alkylketene dimers give hard permanent sizing

sized paper shows high resistance to lactic acid solutions, alkaline and other aqueous penetrants

Uses: Sizing agent reacts with cellulose fibers to form a surface that is resistant to penetration of cold and hot water over a wide pH range. Other uses or potential uses are on textile fibers, wood, asbestos or related mineral hydrates, for sizing, lubricity, abrasion resistance, or other specific characteristics; on pressure-sensitive adhesive tapes as a release agent; for making chemical derivatives by low-temp reaction with alcohols, amines, and the like.

Features: Compound provides a surface treatment that becomes part of the treated material, in contrast to surface modifiers that are merely stuck onto the fibers. These strong chemical bonds give a very hard and permanent sizing or resistance to water penetration.

Highly efficient, hard sizing is obtained with from 2 to 6 pounds of agent per ton of paper. No alum is needed, and agent can be applied under either acid or alkaline conditions. Sized paper shows high resistance to lactic acid solutions, alkaline solutions, and to other aqueous penetrants. There is no problem in handling "broke," and paper can be defibered in same way as any other hard-sized paper.

Description: Aquapel 380 is composed of alkylketene dimers containing, in admixture, a watermiscible emulsifying agent. Structural formula of dimer is:

$$R - CH = C - CH - R$$

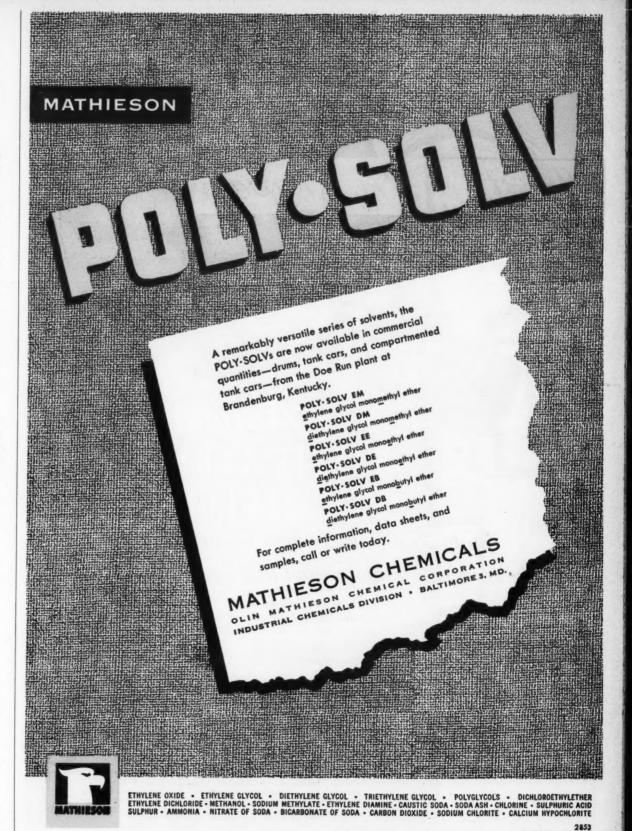
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Key to usefulness lies in the fact that its rate of reaction can be controlled.

Dispersions may be applied by equipment commonly used for surface treatment of paper, such as size tub, size press, calender box, spray, or coating machine. Spray application of emulsions has been quite successful. A 1-5 min cure @ 180-212°F will complete reaction between agent and cellulose.

The agent, a flaked solid, melts at 110°F. Almost white in color, it has a bulk density of about 25 lb/cu ft.

(Sizing agent is a product of Hercules Powder Co., Dept. CP, 940 Market St., Wilmington 99, Del. . . . or for more information check CP 7282 on handy form opposite last page.)



When inquiring check CP 7283 opposite last page

SING



MATERIALS

Hydrophilic and heat-stable amorphous silica has high oll absorbency . . .

surface area can be varied from 135-215 sq

In coatings as a flatting agent, and in Uses: inks and lubricating greases as a thickening and bodying agent. It is a reinforcing additive in resins and plastics.

Compound is hydrophilic, heat-stable, completely insoluble, and has high oil absorbency.

Description: Amorphous silica, called Quso, has particle size of about 15 mu. It is a white, freeflowing powder of extremely light weight and has a surface area that can be varied between 135 and 215 sq M/gm. Compound is available in either mildly alkaline or acid condition (pH 9

(Quso amorphous silica is a product of Philadelphia Quartz Co., Dept. CP, Public Ledger Bldg., Independence Sq., Philadelphia 6, Pa. . . . or for more information check CP 7285 on handy form opposite last page.)

Easily-reacted, cleanly-separating reagent aids research involving polynuclear hydrocarbons . . .

> X-ray powder diffraction patterns of complexes can positively identify compounds

As a reagent for research on problems related to petroleum, coal tar, and pharmaceutical applications.

Compound forms stable, brightlycolored, sharp-melting complexes with polynuclear hydrocarbons and with their derivatives. These are more stable, highly-colored, and easily formed than corresponding picrates.

UV spectra of complexes agrees almost exactly with that obtained by addition of molar extinction coefficients of the compound and reagent. X-ray powder diffraction patterns of complexes can be used to positively identify compounds with as little as 0.001 mg of sample. Unequivocal identification of organic compounds by microscopic fusion analysis has been achieved with 1.0-1.5 mg of sample and reagent.

Description: 2,4,7-Trinitrofluorenone, C<sub>18</sub>H<sub>5</sub>N<sub>3</sub>-O7, is a lemon-yellow crystalline solid melting at 175.5-176.5°C. UV spectrum has two strong broad maxima at 280 m<sub>µ</sub>, and 350 m<sub>µ</sub>. Complexes are easily decomposed and pure components separated. Recovery can be done quantitatively by passing complex solution through activated alumina on which TNF adsorbs strongly, or by chemi-

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Uses: the paint Features: pigment viscosity good for

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When inquiring check CP 7284 opposite last page

cal reduction of the TNF to the amino analog which can be separated from hydrocarbon by washing with acid.

(2,4,7-Trinitrofluorenone is a product of Dajac Laboratories, a Div. of Monomer-Polymer Inc., Dept. CP, 511 Lancaster St., Leominster, Mass. . . . or check CP 7286 opposite last page.)

Heavy pigments kept in suspension by stabilizer that does not require milling with paste . . .

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quantities of only 0.2 to 1.0% are required

Uses: A stabilizer and anti-skinning agent for the paint and varnish industry.

Features: Does not require milling with the pigment paste, is added to finished paint before viscosity adjustment is made. Agent is especially good for keeping heavy pigments in suspension, allowing cutting with less expensive products having a high sp gr.

Description: Agent 31-11 is a derivative of long chain high mw fatty alcohol. Developed in West Germany, this product has very high surface activity. Quantities required depend upon nature of pigments and type of binder, but in general are 0.2-1.0%.

(Pigment stabilizer is distributed in USA by Fallek Products Co., Inc., Dept. CP, 165 Broadway, New York 6, N.Y. . . . or for more information check CP 7287 on handy form opposite last page.)

## Nitro aromatic compounds as intermediates

Uses: Intermediates for use in petroleum, agricultural, and pharmaceutical applications.

Features: In general, undergo reactions typical of nitro aromatic compounds.

Description: Alkylnitrobenzene C-5 and C-12 have general formula  $R \cdot C_6 H_4 NO_2$ . R is equivalent to approximately  $C_5$  for the former, and  $C_{12}$  for the latter. The red to brown liquids have these approximate properties:

C-5 C-12

Refractive index (n<sub>D</sub><sup>81</sup>) 1.5280 1.5088
Sp gr (4°/25°C) 1.060 0.976

Results of toxicity studies are not yet available. Production is in pilot plant quantities.

(Alkylnitrobenzenes are products of Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St. Louis 1, Mo. . . or for more information check CP 7288 opposite last page.)

... for low ash where purity pays and smoothness sells...

# SWIFT'S STEARIC ACID

has less than 10 parts per million

How much ash is that? Ten red dots in the center of a page six times this size would give you some idea.

A natural enemy of lipsticks, lathers and lotions—crayons, A natural enemy of lipsticks, lathers and lotions—crayons, candles and cosmetics, ASH can make shaves raw, candles smoke, and crayons scratch. To be a good basic material for smoke, and crayons scratch. To be a good basic material for smoke, and crayons scratch acid should have the lowest possible all these products, stearic acid should have the lowest possible and content.

Because the ash content is so low our laboratory uses six times the normal weight of sample to get an accurate ash measurement on Swift's Stearic Acid.

Low ash content is no accident, at Swift & Company's modern plant in Hammond, Indiana. The plant is constructed of metals chosen to prevent metallic contamination. Only the better suited grades of raw material are selected from the wide variety available to Swift & Company. Through a unique low temperature solvent process ash, impurities, and color bodies are removed. Every lot is thoroughly checked for specifications and maintained under strict quality control.

Remember, a low ash is a measure of purity and Swift's Stearic Acid is well below the most rigid customer requirement of 10 parts per million. So if purity pays and smoothness sells in your business, here's a sound business offer: Write for details on a trial order of Swift's Single, Double or Triple Pressed Stearic. Try it in your plant, on your equipment. We think you'll agree that . . .

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS



Swift
CENTENNIAL 1955
TO SERVE YOUR INDUSTRY BETTER

Zone\_State\_\_\_\_

When inquiring check CP 7289 opposite last page

# B. F. Goodrich Chemical raw materials



B. F. Goodrich Chemical Company does not manufacture this pipe. We supply only the Geon resin.

# Rigid vinyl pipe pays off in vinegar plant

MANUFACTURING and process-ing 100-grain vinegar—strong enough to eat holes in steel-means high plant piping and maintenance costs in many food plants. But a manufacturer in Ohio recently showed how to take the bite out of the problem, by piping his vinegar plant with high impact plastic pipe made from Geon resin.

The plant's new rigid vinyl pipe is lighter in weight, less costly, easier to install than conventional pipe . . . shows extreme resistance to vinegar and acetic acid corrosion, inside and

out, even up to 150°F. It is easier to clean and maintain, does not scale, will not deteriorate with aging.

The remarkable physical properties and chemical inertness of Geon have led to this kind of problemsolving in many industries. Geon polyvinyl materials are adaptable, versatile, easy to compound . . . for molding, coating, extruding, spraying, and calendering.

To help you improve an old product or build superiority into a new one, complete information is available from Dept. BD-3, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener,



GEON RESINS • GOOD-RITE PLASTICIZERS...the ideal team to make products easier, better and more saleable. GEON polyvinyl materials . HYCAR American rubber and latex . GOOD-RITE chemicals and plasticizers . HARMON colors

When inquiring check CP 7290 opposite last page

#### MATERIALS

Miscible with organic systems, high-purity chromyl chloride promotes rapid reactions . . .

> when protected from light and moisture, compound is stable indefinitely

It is expected that the compound will prove a very useful chemical to the manufacturer of fine organics, for carrying out many difficult oxidations. It can be used to make organic complexes of Cr\*\*\*.

Features: Material has high purity - can be handled easily and stored with negligible corrosion in plain or stainless steel.

Chemically, the compound acts as an oxidizing and chlorinating agent, its miscibility with organic systems promoting rapid reaction. It can be used in vapor phase reactions, and its solutions with chromic anhydride are vigorous oxidizing agents.

Chromyl chloride has a purity of over 98% CrO2Cl2, with small amounts of Cl2 and SO3 as principal impurities. A mobile red liquid, it is nearly twice as heavy as water, and boils without decomposition at about 116°C. At



Shipments are in ICC-approved stainless steel drums of 85 to 200#. Glass bottle contains 400-gm sample

room temp, vapor pressure is nearly the same as that of water. It is miscible with CCl4, C2H2Cl4, CS2, and similar non-polar solvents. Itself non-polar, it has low conductivity and dielectric constant. When protected from light and moisture, the compound is stable indefinitely.

(Chromyl chloride is a product of Research & Development Div., Mutual Chemical Co. of America, a Sub. of Allied Chemical & Dye Corp., Dept. CP, 99 Park Ave., New York 16, N.Y. . . . or for more information check CP 7291 on handy form opposite last page.)

User cont of epoxy

> hammer p sure pads, gree of f of chart ( exceptiona

Example: use: 100 Harder face, which inating ne between pr surface is

core. This ing punch for the die Description Epoxy resi Hardener readily cast simple me containing parts Flex

Hardener 1

Elongation Sp vol (c Mixture cu 15-20 hr, a (Flexible of a product of CP, 5736 geles 45, C

7292 on for

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FAMOUS LIGHTHOUSES OF AMERICA

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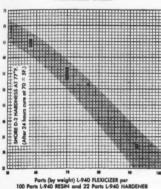
orm

SING

Uses: Ideal for casting drop hammer punches, draw dies, pressure pads, and clamping cushions.

Features: User can control degree of flexibility within limits of chart (below). Resin develops exceptionally tough, resilient sur-

#### FLEXICIZER CHART



100 Paris L946 RESIN and 22 Paris L946 HARDENER Example: To obtain 40-50 Shore, use: 100 parts Resin, 22 parts Hardener, 80 parts Flexicizer

face, which can compress, eliminating need for metal clearance between punch and die. A 1/4-2" surface is cast on a clean metal core. This is used as a metal forming punch utilizing a rigid epoxy for the die.

Description: L-940 Flexible Epoxy resin is mixed cold with Hardener and Flexicizer, and readily cast without pressure into simple molds. Cured product containing 100 parts Resin, 70 parts Flexicizer, and 22 parts Hardener has:

Elongation (% @ 70°F) 50-60 Density (lb/cu in) 0.044 Sp vol (cu in/lb) 22.9

Mixture cures at room temp in 15-20 hr, at 90°F in 2-3 hr.

(Flexible casting epoxy resin is a product of Rezolin, Inc., Dept. CP, 5736 W. 96th St., Los Angeles 45, Calif. . . . or check CP 7292 on form opp. last page.)

For more information on product at right, specify CP 7293
... see information request blank opposite last page.



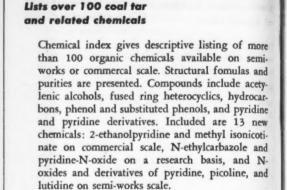


CAPE HENRY LIGHT, located on the south side of the entrance to Checapeake Bay, was the first lighthouse to be built by the United States. The octagonal tower of sandstone, 129 feet high, was constructed of materials gathered while Virginia was still a colony. This original structure still stands, though it was damaged during the Civil War and is no longer in use. It was replaced in 1881 by the present lighthouse, a cast tree tower 167 feet high, located 357 feet to the northeast.

Pointing the way to progress in the development and use of electrochemicals is the pioneering research of Niagara Alkali Company. Niagara was
the first in the country to produce several of these important materials
and through research is constantly improving the usefulness of
Nialk® Liquid Chlorine, Nialk Caustic Potash, Nialk Carbonate of Potash,
Nialk Caustic Soda, Nialk Paradichlorobenzene, Nialk TRICHLORethylene,
Niagathal® (Tetrachloro Phthalic Anhydride).

#### NIAGARA ALKALI COMPANY

60 East 42nd Street, New York 17, N.Y.



"Chemical Index, Second Edition (1955)" is issued by Reilly Tar & Chemical Corp., Dept. CP, 1615 Merchants Bank Bldg., Indianapolis 4, Ind. When inquiring specify CP 7295 on handy form opposite last page.

#### Stabilizes and thickens paint and asphalt emulsions

Uses: As a stabilizer and thickener in paints and asphalt emulsions.

Features: Compound is very economical; it disperses easily in water.

Description: Technical sodium alginate is available as an 80-mesh, slightly bleached powder. Moisture is about 20%. pH in 1% soln is 8-9.

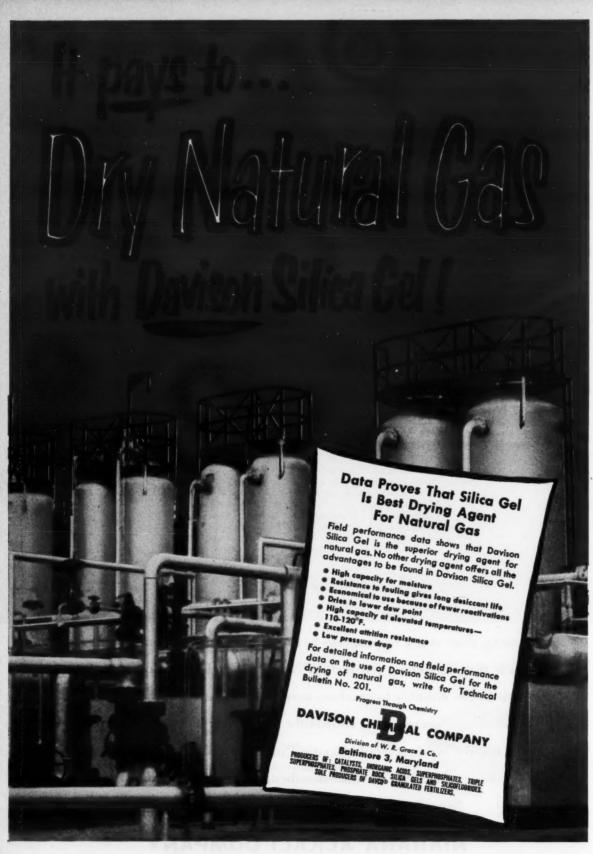
(Protatek 1053 is a product of Croda Inc., Dept. CP, 51 Madison Ave., New York 10, N.Y.... or for more information check CP 7296 on handy form opposite last page.)

# High stability, compatibility, uniformity of hydrocarbon resin suit it for coatings, inks, binders . . .

it is weather-, chemical-resistant, and non-gelling

Uses: As a resin for coatings, inks, asphalt tile, sand binders, and sound deadeners.

Features: Containing no insoluble mineral matter, volatile, or oily components, no change in composition is caused by heating. Compared to products having similar softening points, resin exhibits low gelling and bodying tendencies. Dissolved in low-solvency naphtha, it shows lower initial viscosity and rate of viscosity increase. Maximum stability, weather- and chemical-resistance are additional features.



When inquiring check CP 7294 opposite last page

Description highly-rewith most (R&B) 77°F) is is 1.108. inert to complete the first term of the first

ness, ease (Hydroca Sales Div McGee B more info opposite

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Uses:

Features: positions, and does as an alc Description

(Musk be Inc., Dep N.Y. . . 7298 on 1

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The all

Kermac Resin 641 is a uniform, Description: highly-refined dark hydrocarbon resin, compatible with most gums, resins, and oils. Softening point (R&B) is 310-330°F. Typical penetration (@ 77°F) is zero; at 175°F it is one. Sp gr (60/60°F) is 1.108. It is over 99.5% soluble in CS2. Resin is inert to common formulating ingredients.

Related product, Kermac Resin 640, is similar to 641, but with a 265-285°F softening point. Resin 625 has a softening point range of 150-170°F, with very low penetration values, gives greater adhesiveness, ease of processing.

(Hydrocarbon resins are products of Refining Sales Div., Kerr-McGee Oil Industries, Inc., Kerr-McGee Bldg., Oklahoma City 2, Okla. . . . or for more information check CP 7297 on handy form opposite last page.)

#### Lends sweetness, strength, and fixation to perfume

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In all types of perfumes and colognes, soaps and cosmetics.

Features: It is easy to incorporate into compositions, and is stable to light, air, heat or alkali, and does not cause discoloration. It can be used as an alcohol prefixer.

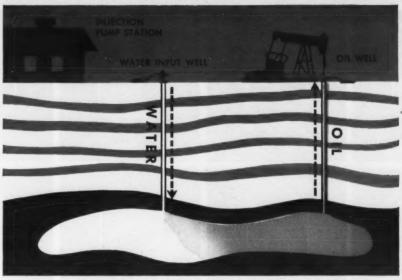
Versalide is a pure chemical of Description: ketonic nature with an intense, sweet odor.

(Musk body is a product of Givaudan-Delawanna, Inc., Dept. CP, 330 W. 42nd St., New York 36, N.Y. . . . or for more information check CP 7298 on handy form opposite last page.)



Want a quick "locator" for specific chemical materials discussed in this issue . . . ?

The alphabetical Product Directory (starting on page 214) will give you a handy page reference to all articles and advertisements.



"Secondary recovery" brings much additional oil from depleted fields, involves injecting Dowicide-treated water into oil-bearing formations to flood the oil to the surface.

# Dowicide Preservatives

## reduce possibility of costly, troublesome plugging of oil-bearing formations

Sulfate-reducing bacteria in oil fields contribute to corrosion of water- and oil-carrying pipe lines . . . Dow Preservatives control them.

Certain by-products are formed during the corrosion of metal pipe lines by sulfate-reducing bacteria. These byproducts contribute to plugging of the oil-bearing formation's porosity. The plugging hinders pumping operations. When Dowicide® Preservatives are added to the flooding water or to the water-oil mixture carried by metal pipes, these troublesome bacteria are controlled.

Fourteen Dowicide Preservatives of widely varying characteristics, but all identified by high stability, ease of

handling, and proved effectiveness, are available today to industry. Among the businesses that hold top product quality or improve manufacturing efficiency with versatile Dowicide Products are paint, leather, adhesives, textile, paper and pulp, agricultural, transportation, cordage and other concerns. You might well benefit your processing, packaging or selling operations by using one or several of these outstanding bactericides, germicides or fungicides.

Dow's laboratory specialists will consult with you regarding individual preservative problems. For detailed information, mail coupon to THE DOW CHEMICAL COMPANY, Midland,



Pipe cutaway (left) shows typical corrosion of metal pipe lines occurring in the presence of sulfate-reducina bacteria.

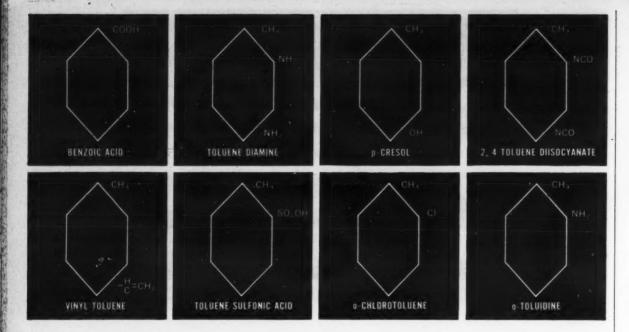
Dept. DP 652C, Midlan Please send me further	d, Michigan information on the uses of
Dawicide Preservatives.	
Name	
2.	
Title -	
Title	AUGICALIA ANTERIO DE MI

you can depend on DOW CHEMICALS



When inquiring check 7299 opposite last page

Dow



If you produce these or related compounds ...

# SUN TOLUENE WILL GIVE YOU HIGHER YIELDS...MINIMUM IMPURITIES

The increased use of toluene as a chemical raw material created the demand for a purer product. Sun met this demand last year when it built its new aromatics plant.

Since then, industries using new high purity Sun Toluene have been reporting increased plant efficiency...better quality in their finished products...increased life of many of their catalysts.

Sun Toluene has a purity (mol. percent.) of 99.9. The bromine index test, a most sensitive measure of olefins, typically shows negligible results. Typical results from the isatin test show that Sun Toluene is thiophene-free.

In addition, Sun Toluene is guaranteed to contain less than 0.5% paraffins...well below the ASTM maximum of 1.5%. As a matter of fact, by the ASTM Test, Sun Toluene normally contains no paraffins whatsoever.

#### TYPICAL TESTS

Parattins				9		Nil	
Bromine Index (uns	at	ига	tes	) .		Negligible	
Acid Wash Color, AS	T	N				1	
Distillation Range				•		0.6 C incl. 110.6 C	
Sulphur, Wt. % .			9			0.001	
Mol. % Purity .						99.9	
Thiophene (Isatin)						Negative	

For complete specifications and more information about Sun Toluene see your Sun representative... or write for Technical Bulletin #27. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. CP-6

INDUSTRIAL PRODUCTS DEPARTMENT

# SUN OIL COMPANY SUN

PHILADELPHIA 3, PA.

In Canada: Sun Oil Company, Ltd., Toronto and Montreal



When inquiring check CP 7300 opposite last page

#### MATERIALS

### Impart flame resistance to rubber stocks . . .

chlorinated paraffins are light-colored, non-toxic

Chlorowax 70 is a resinous modifier with all types of elastomers. Eighty-five parts of the wax, with 15 parts Sb<sub>2</sub>O<sub>3</sub> gives good flame resistance in GR-S, nitrile, and natural stocks. It also serves as a reinforcing agent and plasticizer. The compound is a light-colored, non-toxic, resinous chlorinated paraffin in powder form.

Melting point (B&R, °C)	95-110
Sp gr (solid)	1.62-1.70
Dielectric constant (103 - 106 cy)	2.9-2.7
Odor	none
CI content (%)	68-73
Average chemical formula	C24H29Cl21

Chlorowax 40 is a non-flammable plasticizer and softener for neoprene and other rubber stocks. It has low volatility and is chemically inert. Compound is a clear, light, amber-colored liquid chlorinated paraffin which is non-toxic.

Sp gr (25/25°C)	1.14-1.17
Evaporation rate (gm/sq cm/hr	
@ 100°C)	0.000004
Viscosity (poises @ 25°C)	20-28
Chlorine content (%)	40-42
Average chemical formula	C24H49Cl7

(Chlorinated paraffin flame retardants are products of Chlorinated Products Div., Diamond Alkali Co., Dept. CP, 300 Union Commerce Bldg., Cleveland 14, Ohio. . . . or for more information check CP 7301 on handy form which is located opposite last page.)

# Combines good heat stability with excellent bond strength in insulating varnish . . .

modified silicone resists oil, moisture, solvents

Uses: Silicone dipping and impregnating varnish is recommended for heavy duty electrical equipment subjected to overloads and periodic cleaning and inspection.

Features: Material combines good heat stability with excellent bond strength and outstanding resistance to oil, moisture, and solvents. Insulating life expectancy is 25 to 50 times that of good organic varnishes at Class B hottest temp of 130°C.

Description: Sylkyd 1400 Varnish is supplied as a 40% resin solids solution in xylene and Solvesso No. 3, at a viscosity of 400-800 cps. It dries within one hr at 300°F and cures in 10-12 hr at 300°F. For max bond strength and oil resistance, a 2-4 hr cure at 400°F is recommended. Sp gr (@ 25°C) is 0.96-1.00.

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58 SHADES AND TYPES

#### PURE RED IRON OXIDES

KROMA REDS®
(6 Shades)
"100" SERIES REDS
(6 Shades)
"1000" SERIES REDS
(12 Shades)
RY SERIES REDS
(4 Shades)

RED IRON OXIDES
(18 Shades)

VENETIAN REDS

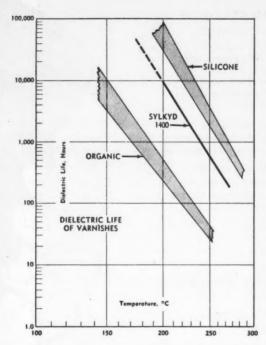
(12 Shades)

Whenever red is the question, be sure to see your Williams representative. Meanwhile, send today for complete technical information.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.
E. ST. LOUIS, ILL. EASTON, PA.
EMERYVILLE, CAL.

When inquiring check CP 7302 opposite last page



The chart below compares relative life expectancy of Class B and Class H insulation and Sylkyd 1400 Varnish, as a function of aging temp. Curves are plotted from number of hours aging required, at various temp, to reduce dielectric strength of the respective materials to 200 vpm.

(Modified silicone varnish is a product of Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. . . . or for more information check CP 7303 on handy form opposite last page.)

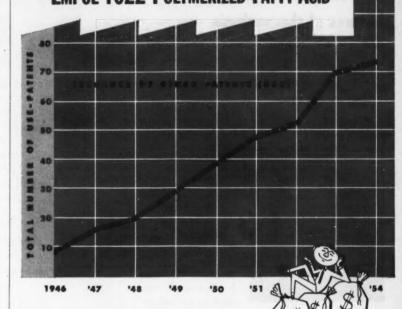
## Presents handy reference guide to 350 $\pm$ organic chemicals

Description and physical properties of over 350 organic chemicals are featured in 24-page reference guide. For easy reference, chemicals are arranged by family groups with condensed application data. Alphabetical index is included.

Booklet F-6136 is issued by Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N. Y. When inquiring specify CP 7304 on handy form opposite last page.

Processing and Engineering Data starts on page 194 of this issue

# every year more use-patents are issued to U.S. companies based on EMPOL® 1022 POLYMERIZED FATTY ACID



enjoy the rewards
of this unique DIBASIC ACID—
investigate it today!

There is no more dramatic proof of the versatility of this unsaturated, high molecular weight, dibasic acid than the number of use-patents which have been issued to U. S. companies. These aggressive firms, in the last seven years, have exploited Empol 1022 with profitable vigor. The result has been a host of new uses for polyesters, polyamides, esters, amides, soaps, and other derivatives in such fields as adhesives, coatings, petroleum, surfactants, resins, and rubbers.

But, the discovery of all these uses for Empol 1022 Polymerized Fatty Acid has by no means exhausted the possibilities. Its unique combination of high viscosity, excellent heat stability, dibasic structure, and relatively high molecular weight (C<sub>ss</sub>) still offers unlimited opportunities to alert research organizations. Why don't you investigate Empol 1022 and see how it can be transformed into profitable end-products?



Fatty Acids & Derivatives Plastolein Plasticizers Twitchall Oils, Emulsifiars

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohie New York-Philadelphia-Lowell, Mass.-Chicago-San Francisco-Cleveland Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles Export: 2205 Carew Tower, Cincinnati 2, Ohio

Emery industries, inc., Dept. CP-6 Carew Tower, Cincinnati 2, Ohio
Please send me the following:
☐ Technical information on Empol 1022 ☐ Literature and patent bibliography
NameTitle
Company
Address
CityState

When inquiring check CP 7305 opposite last page

### High strength and darity features of thermoplastic nylon material

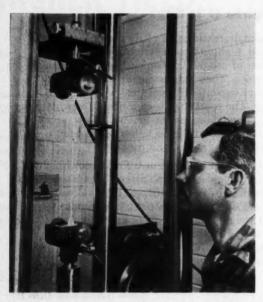
its high molten viscosity serves to make extrusion easy

Uses: In industrial and consumer products such as high strength clear film, molded bottles, gears, bear-



ings, bushings, wire jacketing, valves, instrument housings, and coil forms. Sheets can be laminated with vinyls, polyethylene, paper. Axial orientation increases physical properties, allowing production of thin films for packagings.

Plastic has high tensile strength and abrasion resistance. It is lightweight, and has self-lubricating properties, good chemical resist-



With constant pull of >12,000 psi on testing machine, caprolactam-type nylon shows an elongation of 300%

ance, high heat resistance, and excellent impact strength and toughness. Improved moldability permits production of larger parts with thicker sections. Because of its high molten viscosity, extrusions are easy. Crystalline structure can be controlled to give clear products.

### SATURATED ALCOHOLS

LAURYL ALCOHOLS (C12)

Adol 14 62% Lauryl

Adol 15 68% Lauryl

CETYL ALCOHOLS (C16)

STEARYL ALCOHOLS (C18)

Adoi 68-90% Steary

CETYL-STEARYL

ARACHIDYL-BEHENYL ALCO

BEHENYL ALCOHOL (Car

1, 12 HYDROXY STEARYL ALCOHOL (C18)

#### UNSATURATED ALCOHOLS

STEARYL OLEYL (C.)

Adol 42

OLEYL ALCOHOLS (C18)

Adol 37 cloud pt. 92"

Adol 34 cloud pt. 85° F Adol 33 cloud pt. 68° P Adol 32 cloud pt. 64° F Adol 80 cloud pt. 46° P

LINOLEYL ALCOHOL

Unadel 40

LINOLENYL ALCOHOL

Unadoi 90

ARACHIDONYL-CLUPANODONYL (C20-C22)

Unadal 21

ERUCYL ALCOHOL (C22)

RICINOLEYL ALCOHOL (C10)



Aerial vieu new fatt plant in As

### Archer Daniels Midland company

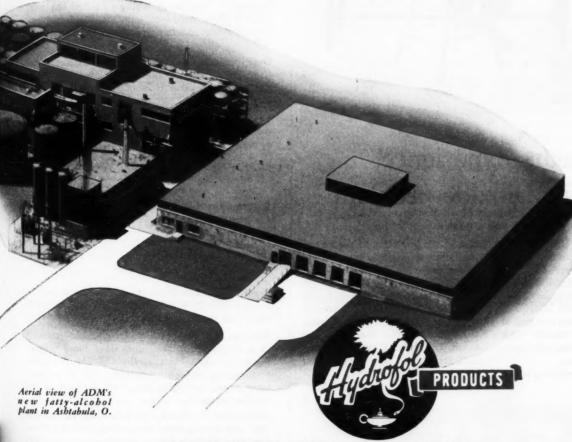
CHEMICAL PRODUCTS DIVISION . 2191 WEST 110th ST., CLEVELAND 2. 0HIO

### .from Ashtabula to you!

#### NEW FATTY ALCOHOLS TO WORK WITH

Starting into full production, this month, are advanced alcohols never before available—saturated and unsaturated fatty alcohols that can impart characteristics to textiles, plastics, lubricating oils and greases, and detergents as well as countless other products.

Here in one of the country's fastest growing chemical centers, ADM will process linseed, soybean, marine and coconut oils, animal fats and many other fats into ADOLS and UNADOLS of improved properties and higher purity. You are the benefactor for it is into your products that these new chemicals will pour. Check the list carefully on the left, and write for samples and specifications. As new alcohols are developed, we will publish advance information. A letter from you will put your name on the select list to receive information about these new ADM Chemifats.



Hydrogenated and Distilled Fatty Acids and Stearic Acid . . . Hydrogenated Vegetable, Fish, Sperm Oil and Tallow . . Hydrogenated Castor Oil . . Stearyl, Cetyl, Oleyl, Alcohol . . Sperm Oils and Spermaceti . . Behenic Acid . . . Erucic Acid . . . Hydroxystearic Acid.

Other ADM Products:

Linseed Oil, Soybean Oil, Fish Oil, Paint Vehicles, Vinyl Plasticizers, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa Meal, Livestock and Poultry Feeds,

When inquiring check CP 7306 opposite last page

Description: Plaskon Nylon 8200 is a type 6, caprolactam-type, nylon. Physical properties of molded products include:

Ultimate tensile strength (psi)	12,000
Ultimate elongation (%)	300
Modulus of elasticity (in tension, psi)	300,000
Compressive failure (psi)	11,000
Impact strength (Izod, ft-Ib/in of notch)	1.2
Flex strength (psi, specimen did not break)	10,000
Heat distortion temp (°F @ 264 psi)	136
Hardness (Rockwell R)	118
Sp gr	1.13
Dielectric strength (short time- 0.1 in, v/mil @ 10° cy)	420
Dielectric constant (@ 10° cy)	4.5
Flow temp (°F)	419

Specimens conditioned in accordance with ASTM D618-53 (Caprolactam-type nylon is a product of Barrett Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. . . . or for more information check CP 7307 opposite last page.)

### Resistance to oxidative rancidity feature of vaccenic acid . . .

many derivatives possible from the compound

Uses: In cosmetic, industrial, and food formulations, and in biochemical research.

Features: Trans configuration resists oxidative rancidity more than oleic acid or any of its cis isomers. Double bond, on 11th carbon atom, undergoes ozonolysis and hydroxylation to give aldehydes, acids, and hydroxy compounds which are not currently available. Halogenation also produces interesting derivatives.

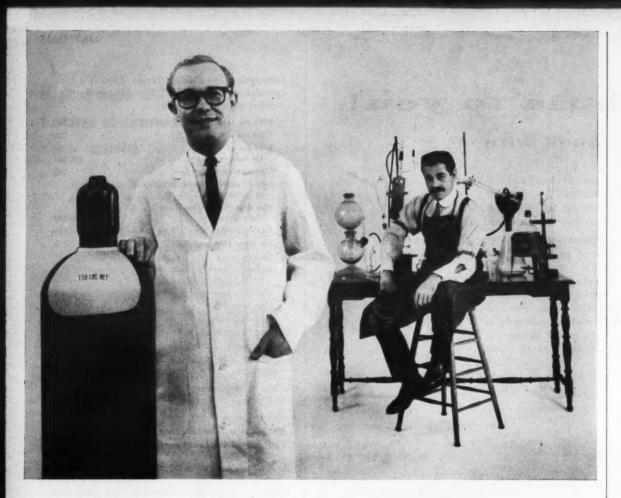
Description: Commercial grade vaccenic acid is 85% trans-11-oleic acid. Melting range is 30-35°C. Neutralization equivalent of this white crystalline solid is 280. Iodine value is 75-80. A 98%-pure product is also available in limited quantities.

(Vaccenic acid is a product of Jasonols Chemical Corp., Dept. CP, 825 E. 42nd St., Brooklyn 10, N. Y. Check CP 7308 opposite last page.)

#### Industrial chemicals

Illustrated 24-page booklet catalogs alphabetically chemicals and catalysts for practically every phase of modern industry. "Harshaw Industrial Chemicals" is issued by The Harshaw Chemical Co., Dept. CP, 1945 E. 97th St., Cleveland 6, Ohio. When inquiring specify CP 7309 on handy form opposite last page.

ING



## We can apply 40 years experience to help solve your Sulfur Dioxide problem

The chemist in the background (above) dates us-August of 1915 to be exact. This was the month and year we shipped our first cylinder of liquid sulfur dioxide.

A good deal of our energies during the past 40 years have been devoted to perfecting a quality-control system for the manufacture of sulfur dioxide. Today, we are supplying our customers a near 100 percent pure grade (99.9%) of this chemical.

Equally important, to our way of thinking (our customers' too), has been the growth of our service facilities. Over the years we have been privileged to serve and instruct a host of industries in the economical application of sulfur dioxide. This background of diversified experience is available for your use.

Special problems involving sulfur

dioxide, those relating to new or unusual uses, receive special attention in our research laboratories. So if your chemical process includes bleaching, acidifying, purifying, fumigating, reducing, or preserving, investigate the advantages of using Ansul liquid sulfur dioxide. Write ANSUL CHEMICAL COMPANY, Dept. C-34 Industrial Chemicals Division, Marinette, Wisconsin.



When inquiring check CP 7310 opposite last page

#### MATERIALS

#### Information on alkylanilines

Two-page technical data sheets each describe an alkylaniline suggested for use as intermediates in petroleum, agricultural, and pharmaceutical applications. Specifications and properties are given. Bul C-5 describes an alkylaniline with an average of five carbons for the ring-substituted alkyl group. Bul C-12 describes the properties of a mixture in which the alkyl group averages 12 carbons. Buls C-5 and C-12 are issued by Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St. Louis 1, Mo. Check CP 7311 on handy form opposite last page.

#### Improves ozone resistance of butyl rubbers

Processing aid for butyl rubber to improve ozone resistance.

Besides imparting a marked improve-Features: ment in ozone resistance, resin increases resistance to heat aging and improves electrical characteris-

Description: Kenflex A is a synthetic aromatic hydrocarbon resin. It can also be used as a processing aid with other types of rubber.

(Kenflex A is a product of Kenrich Corp., Dept. CP, 57-02 48th St., Maspeth 78, N.Y. . . . or for more information check CP 7312 on handy form opposite last page.)

#### Offers phosphorescent pigments for plastics, paints, silk-screen inks . . .

long afterglow type emits light for 6-15 hr; short afterglow, for 1/2-2 hr

As phosphorescent pigments for paints, plastics, and silk-screen inks. Applications include radio and door knobs, signs, and toys.

Both pigments have a light emission in a variety of colors: blue, light blue, yellowgreen, orange. Their daylight color is either whitish-gray or whitish-yellow, and in adding small amounts of colorants, their daylight appeal can be enhanced.

Description: Violite Pigments can be divided into two basic groups: long afterglow which has a light emission of 6-15 hr after each daylight exposure, and short afterglow which emits light from 1/2-2 hr.

Long afterglow pigments are sulfides of Ca and Sr activated with traces of Ag, Ni, Cu, Mn, etc.

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Short afterglow pigments are sulfides of Zn or Cd or both, activated with similar elements. Both are treated at >2000°F temp, and should not be severely milled or ground.

For their use in plastics, clear molding powders are recommended. For long afterglow types, acrylics, polystyrene, vinyl resins, and polyethylenes are best suited. Short afterglow types can be used in these resins, and also cellulose acetate.

(Violite Phosphorescent Pigments are products of Rhode Island Laboratories, Inc., Dept. CP, 100 Pulaski St., W. Warwick, R.I. . . . or for more information check CP 7313 on handy form opposite last page.)

#### Produces water-in-oil emulsions that are stable to mild acids, electrolytes, metallic salts . . .

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lanolin alcohols contain 28-30% cholesterol

Uses: As an emulsifying agent for water-in-oil emulsions used in industrial, cosmetic, and pharmaceutical applications. Uses in the electrical industry are indicated.

Features: Emulsions, when well prepared, are very stable in presence of electrolytes, mild acids, and metallic salts. Compound bestows its emulsifying properties to any oil or fat in which it is dissolved. Used with lanolin, its water absorption properties can be greatly improved.

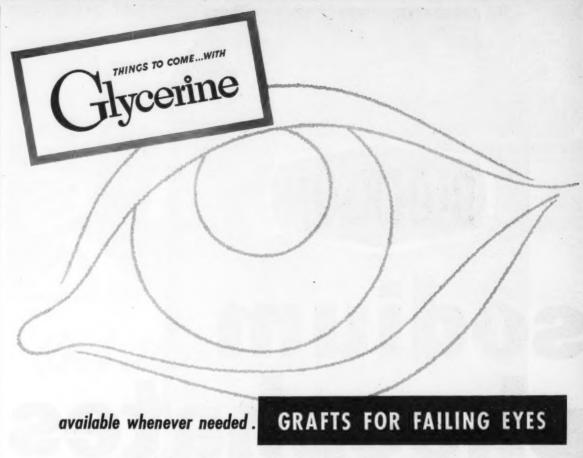
Description: Hartolan is a wax, consisting of the unsaponifiable part of lanolin (lanolin alcohols) and contains 28-30% of cholesterol. Its dielectric constant is unusually high.

(Lanolin alcohol is a product of Croda Inc., Dept. CP, 51 Madison Ave., New York 10, N. Y. . . . or for more information check CP 7314 on handy form opposite last page.)

## Information on use, compounding surface-active agents

Monamines comprise a group of fatty acid-amine condensates which are good detergents, wetting agents, emulsifiers, dispersing agents, and thick-eners for many different applications, including cosmetics, liquid cleaners, textile and leather processing, polishes and waxes, pigment dipersions, paint removers, and agricultural sprays. Information on use and compounding these high purity surface-active agents are presented in four-page bulletin.

Folder No. 220 is issued by Mona Industries, Inc., Dept. CP, 65 E. 23rd St., Patterson 4, N.J. When inquiring specify CP 7315 opposite last page.



Imagine the tragedy in years past of corneal grafts spoiling after a few days storage—leaving none available when needed for surgery.

The future is more promising. Even stockpiling is a possibility, because scientists have found a way to preserve grafting material indefinitely, without affecting sight-restoring powers.

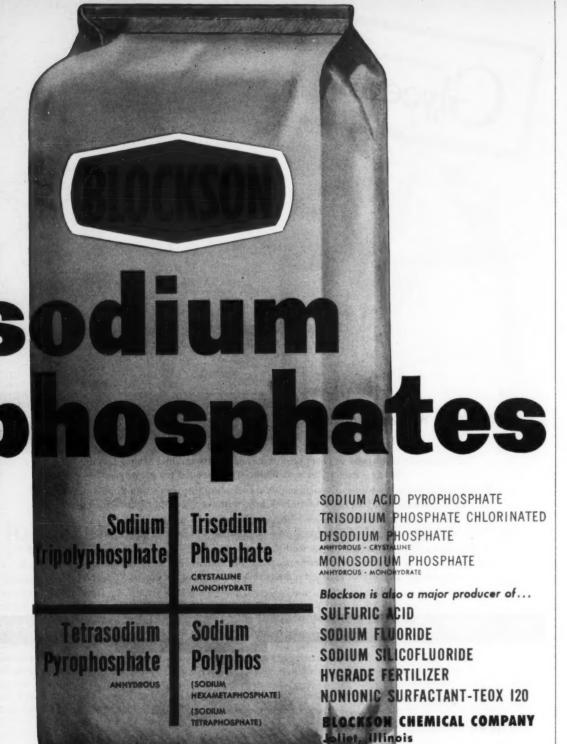
The new technique, now being experimentally used in hospitals, relies on subzero temperatures—and saline solutions of *Glycerine*.

In medicine and pharmaceuticals, as well as many other fields, Glycerine's unique balance of properties continues to open new doors to progress. For tomorrow's surge of new specialties . . . in formulations and reactions yet unknown. Nothing takes the place of Glycerine.



For your free copy of any or all of these booklets write: GLYCERINE PRODUCERS' ASSOCIATION • 295 Madison Ave., New York 17, N.Y.

When inquiring check CP 7316 opposite last page



When inquiring check CP 7317 opposite last page

# Addition of catalyst is made unnecessary with 2-part thermosetting adhesive for metals, porous mediums . . .

bond is flexible, water- and heat-resistant

Uses: Structural laminating adhesive for steel, zinc coated steel, or aluminum to porous mediums such as wood, fire brick, asbestos board, and plastics.

Features: Catalyst addition is unnecessary. Adhesives have two to seven days stable working periods (at room temp) coupled with fast-curing hot or cold press. Bond is flexible, water- and heat-resistant.

Description: Duro-Lok thermosetting emulsion is a 50-50 (by volume) mixture of Resyn 5101 and Resyn 5121. It can be diluted with water for viscosity adjustment. Hot press cure is 1 min @ 300°F; cures at room temp in 18-24 hr under pressure.

(Thermosetting adhesive is a product of National Resyns, Div. of National Starch Products Inc., Dept. CP, 270 Madison Ave., New York 16, N.Y. . . . or for more information concerning manufacturer's product reader may simply check CP 7318 on handy form opposite last page.)

# Holds on to bright initial colors, resists acids and alkalis — when resin latex is used . . .

paint formulations based on vinyl acetate resin latex form tough, stable films quickly

Uses: Latex is specifically designed for interior surface coating applications.

Features: Ability to hold on to bright initial color, toughness, and resistance to acids and alkalis during aging tests are features of resin latex. Paint formulations based on it form tough, yet stable, surface films quickly. Stabilizing system imparts increased water resistance to films. Low susceptibility to attack by microorganisms is exhibited.

Description: Latex, designated WC-130, is an unmodified vinyl acetate polymer. Wide color range is available through various pigment combinations. Satisfactory pigment dispersions are prepared on pebble and roller mills as well as with high speed stone mills and colloid mills.

(Vinyl acetate resin latex is a product of Bakelite Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information about manufacturer's product reader may simply check CP 7319 on the convenient Reader Service slip which is located opposite last page.)

Colloida

Cab-O antisett emulsic is subjuflatting CPai-3. Godfre St., Bo CP 732

Cure age gives low and long

high ature

Uses: castings, I bers. Features:

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CP 7321 o

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Sequestering er for hea On a solids power (gagent):

Ferric ion Ferric ion Cobalt Copper Nickel Zinc Agent is n

alkaline ear (Kalex G Dept. CP, or check C

#### Colloidal silica for paints

Cab-O-Sil colloidal silica for use in paints as an antisettling agent, a transparent extender, an emulsion stabilizer, and to modify flow properties is subject of Bul CPai-2. Use of the material as a flatting agent for varnishes is described in Bul CPai-3. Both are issued by White Pigments Div., Godfrey L. Cabot, Inc., Dept. CP, 77 Franklin St., Boston 10, Mass. When inquiring specify CP 7320 on handy form opposite last page.

#### Cure agent for heat-resistant epoxies gives lower exotherm temperature and longer pot life . . .

high impact strength given over wide temperature range

As curing agent for heat-resistant epoxy castings, laminates, adhesives, and structural memhers.

Agent gives longer pot life and lower exotherm temp than obtainable from solid catalysts. Thicker sections can be cured without cracking or discoloration. High impact strength is imparted over a wide temp range.

Description: Curing Agent 105 comes in liquid form. No premelting or preheating of catalyst or resin is necessary. When cured with catalyst, physical properties of epoxies are retained up to 150°C.

(Curing agent for epoxies is a product of Aries Laboratories, Inc., Dept. CP, 270 Park Ave., New York 17, N.Y. . . . or for more information check CP 7321 on handy form opposite last page.)

#### Has high sequestering power for heavy metal lons . . .

holds 1.7 grams of Fe+++/gm at pH of 11

Sequestering agent displays highest chelating power for heavy metal ions of any agent examined. On a solids basis, agent shows following chelating power (gm of metal ion sequestered/gm of agent):

Ferric ion (pH = 7)	0.90
Ferric ion (pH = 11)	1.7
Cobalt	0.62
Copper	0.52
Nickel	0.44
Zinc	0.38

Agent is not recommended for sequestration of alkaline earth ions.

(Kalex G is a product of Hart Products Corp., Dept. CP, 1440 Broadway, New York, N.Y. . . . or check CP 7322 opposite last page.)



# Here's aluminum Chloride

## in the RIGHT SIZE for your use

Most often, a particular process using aluminum chloride, anhydrous, works best with a selected particle size.

We have taken technical liberties in this picture (exposing aluminum chloride to the air) to show you the four sizes available from Hooker.

Extra work of screening isn't necessary when you specify Hooker aluminum chloride. The four sizes give you a choice that will meet just about every process requirement:

1. Extra fine grind is unscreened, with

90 to 95% passing 40 mesh.

- 2. Fine grind is unscreened, practically all passing 20 mesh.
- 3. Coarse grind is unscreened, 1 mesh and finer. It contains 25 to 35% finer than 20 mesh.
- 4. Coarse screened is the same as coarse grind (No.3), but is screened to remove 20 mesh and finer.

Before re-ordering your requirements, get the facts on Hooker aluminum chloride. For technical data, just phone the nearest Hooker office listed below, or mail the coupon today.

Need other chlorides? This is only one of several metal chlorides available from Hooker. Chlorinated organics and inorganics are specialties with us; we've been making them for more than 30 years. If you need a special chlorine-containing compound in quantity, we may be able to produce it for you economically. To find out quickly, just phone the nearest Hooker office or write us today.

#### FOR FAST SERVICE, PHONE:

CHICAGO	CEntral	6-131
LOS ANGELES	NEvada	6-382
NEW YORK MU	rray Hill	2-250
NIAGARA FALLS		. 665
TACOMA	BRoadwa	y 121

HOOKER	<b>ELECTROCHEMICAL</b>	COMPANY
15 Forty-sev	enth St., Niagara Falls, N.	Υ.

 Data sheet on Hooker aluminum chloride, anhydrous ☐ Bulletin 100 describing Hooker products and services

1905-Half a Century of Chemicals

From the Salt of the Earth-1955

#### HOOKER ELECTROCHEMICAL COMPANY

NIAGARA FALLS . TACOMA . MONTAGUE, MICH. . NEW YORK . CHICAGO . LOS ANGELES

When inquiring check CP 7323 opposite last page

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# HARSHAW

industrial and laboratory

# chemicals

Electroplating Salts, Anodes and Processes...

Driers and Metal Soaps...Cadmium Pigments
...Vinyl Stabilizers...Ceramic Opacifiers and
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This sixteen page book "Harshaw Chemicals for Industry and Laboratory" describes Harshaw's major activities.





When inquiring check CP 7324 opposite last page

#### MATERIALS

## Resistance to creaming or separation shown by silicone mold release . . .

not affected by additives or common metals

Uses: Parting agent for rubber, plastics, metal.

Features: Agent is more resistant to creaming or separation than any comparable emulsion. Unaffected by additives or common metals, it is dilutable in hard or soft water and imparts a smoother, glossier surface finish to molded rubber parts.

Description: Mold Release Emulsion 36 has a particle size less than 1/10 that of earlier silicone emulsions. Tests show emulsion won't break after 168 hr @ 158°F, or after eight freeze-thaw cycles, or after recirculation through centrifugal pump. (Silicone mold release is a product of Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. Check CP 7325 opposite last page.)

# Combines protective and dispersing properties inherent to proteins with soap-inherent detergency . . .

surface-active agent finds use for vat, naphthol, and acetate dyeing

Uses: As a surface-active agent for vat, naphthol, and acetate dyeing. It also gives controlled bleaching action.

Features: Agent combines excellent proteininherent protective and dispersing properties with soap-inherent detergent capacities, without the disadvantages of soap. It is stable to bleaching powder, hypochlorite and peroxide solutions. As a result, bleached fabrics show greater tensile strength.

Description: Procol PW is a condensation product of degraded protein and fatty acid. Odorless, light-colored, and of maximum efficiency, it has high purity.

(Surface-active agent is a product of Hart Products Corp., Dept. CP, 1440 Broadway, New York, N. Y. Check CP 7326 opposite last page.)

#### Manual of herbicide formulations

Formulators' manual covers latest emulsifier recommendations for high and low volatile 2,4-D or 2,4,5-T esters as well as carbamate herbicides.

Bul #43 "Formulators' Manual of Herbicide Formulations" is issued by Emulsol Chemical Corp., Dept. CP, 59 E. Madison St., Chicago 3, Ill. Specify CP 7327 opposite last page. Water

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### Water softener salt recommendations

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Evaporated, rock, and Solar salt are discussed in detail in four-page research bulletin. Packing information and availability of salt for zeolite regeneration for specific areas of the country are shown.

"What Type of Water Softener Salt Should I Use and Recommend" is issued by Morton Salt Co., Dept. CP, 120 S. LaSalle St., Chicago, Ill. When inquiring specify CP 7328 on handy form opposite last page.

### Paint pigment system offers 324 colors . . .

is used for exteriors, interiors with two bases per finish

Paint color tube system gives 324 colors for both exterior and interior use with only two bases in each finish, including interior flat, gloss, semigloss, deluxe alkyd enamel, and exterior house paint. Colors are produced by adding one, two, or three of the 12 paint colorants to proper base. Color can be mixed by hand due to complete compatibility of both colorant and base paint.

(Surfastyle Custom Colored Paints are a product of McDougall-Butler Co., Inc., Dept. CP, 2929 Main St., Buffalo 14, N.Y. . . . or for more information check CP 7329 on handy form which is located opposite last page.)

#### Small and uniform cell structure imparted to chemically-blown vinyl sponge by plasticizer

Uses: A plasticizer for manufacture of open cell chemically-blown vinyl sponge. Compound has been developed for use with du Pont's blowing agent BL-353.

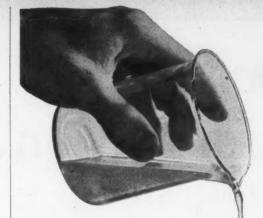
Features: A sponge is produced that has flame resistance, high resilience, low density, and low odor level. Cell structure is small and uniform.

Description: Plastoflex SP-2 has these specs:

Color (G-H) 2-3 Viscosity (cps @ 25°C) 200 Sp gr (@ 25°C) 1.03

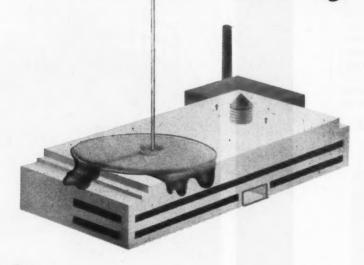
Odor is very slight. Proper precautions must be taken in preparation of the plastisols.

(Plasticizer for vinyl sponge is a product of Advance Solvents & Chemical Corp., Dept. CP, 245 Fifth Ave., New York 16, N.Y. . . . or for more information check CP 7330 on handy form opposite last page.)



# If you use water in your process...

USE EMULSIFIABLE AC\*Polyethylene



for the first time . . . a polyethylene that is emulsifiable in water!

If water is your processing medium . . . if you use water in any stage of your operations . . . you should try emulsifiable A-C POLYETHYLENE.

With low-molecular-weight A-C POLYETHYLENE, you can prepare fine particle size, stable, clear emulsions which may be applied with any equipment now employing water systems.

Emulsifiable A-C POLYETHYLENE is now available in quantity for commercial trials. If you will write us on your business letterhead indicating your intended use, we will send you literature or such information as you may require.

#### SEMET-SOLVAY PETROCHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
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\*Trade Mark

When inquiring check CP 7331 opposite last page

#### Lists rare organics

List of available rare organic chemicals for which bids are welcome, and also a two-page listing of quantity and prices of other rare organics is issued by Chemicals Procurement Co., Dept. CP, 550 Fifth Ave., New York 36, N. Y. Specify CP 7332 opposite last page.

## Gives typical formulation for sprayable coating . . .

has chemical- and abrasion-resistance

Low-viscosity styrene-butadiene copolymers, Pliolite S-5 resins, come in viscosity range of 100-240 sec (#4 Ford Cup), have excellent deflocculating characteristics. Lowest viscosity resin S-5D finds applications in sprayable industrial finishes. A typical formulation is:

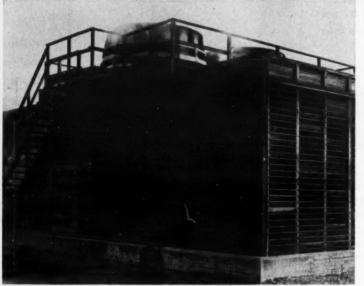
Ingredient	1b/100 gal
Tio, (Rutile NC)	198.3
Lampblack	5.2
Yellow iron oxide	5.2
Red iron oxide	1.3
Pliolite S-5D	190.9
Chlorinated paraffin 4	
BPR: 316-349°F)	237.2
Mineral spirits (KB-36,	BPR:
305-385°F)	237.1
Silicone SF-69	0.1
Total	904.0
Solids: 47.5% (wt.) KU @ 77° F:69.	PVC: 19.9%

For spraying, reduction by volume of 33-1/3% with Solvesso 100 is recommended. This gives a viscosity of 22.5 seconds. Atomizing pressure between 30-40 psi is satisfactory. Gloss readings between 90 and 95 can be attained on air dried films. Chemical- and abrasion-resistance are excellent.

Possible applications include: machinery finishes, one-coat maintenance finishes, immersion and tank linings, marine finishes.

(Styrene-butadiene paint resin is a product of Chemical Div., The Goodyear Tire & Rubber Co., Inc., Dept. CP, 1144 E. Market St., Akron 16, Ohio. Check CP 7333 opposite last page.)





### PRODUCTION MEN CAN REDUCE MAINTENANCE HEADACHES WITH PENTA-TREATED LUMBER

Countless production men are discovering that wood works harder when it is preserved with Penta. This cooling tower, for instance, constructed with Penta-treated lumber, will give far longer maintenance-free service because:

Penta prevents wood decay, assures long life for both structural and baffle members under constant water-

spray bombardment. Costly cooling system shutdowns and repairs are eliminated.

And Penta-treated wood is clean, easy to handle; won't bleed to stain clothing, will not "burn" hands.

For full information on Monsanto Penta, just check the coupon and send it along to Monsanto.

### New booklet tells how molten phthalic and maleic anhydrides save time, money

A new booklet, just off the press, details the important economies which can be achieved in handling phthalic and maleic anhydrides as molten liquids.

Savings in material costs, manhours, and manufacturing procedures are effected because:

- 1. Raw material costs are lower ... savings on finishing and packaging are passed on to you—½¢ per pound on phthalic, 1¢ on maleic.
- 2. Processing up-heat time is cut. By pumping to kettle instead of dumping solids, phthalic anhydride reaches process at temperatures above 131°C.; maleic anhydride above 52°C. Some plants report up to 10% output increase.
- 3. Pumping is cheaper, easier, faster than dumping. Less danger of contamination because material is confined in closed pipes; annoying fumes and dust are practically eliminated.
- 4. Inside warehouse space is not required. Handling phthalic and maleic anhydrides in piping-storage tank system saves under-roof warehouse space which can be used for finished product.

This new booklet also gives you recommended layout, materials of construction, unloading and pumping procedures.

Check the coupon for your copy.

### Quick facts on Phenol

Handle phenol with greater safety by

- Equipping storage facilities with flame arrestor vents.
- Grounding all tank-car and storage facilities to avoid fire hazard.

For other useful information on how to handle, store, transfer, and unload phenol, send for your copy of "The Handling of Phenol." Mor Arod an e tran

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For more 1248, che

#### More reports prove Aroclor 1248 is an effective heattransfer medium

Reports received from installations show that Monsanto Aroclor\* 1248, a chlorinated biphenyl, is proving to be a superior heat-transfer medium. Anonflammable, liquid-phase, heat-transfer fluid, it is designed for operation at atmospheric pressure at maximum temperature of 300° C.



The outstanding performance characteristics of Aroclor 1248 were demonstrated with a portable electric heater designed to reach temperatures not attained by ordinary steam pressures. Test results show Aroclor 1248 provides these advantages:

Freedom from fire hazard.

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Viscosities which permit pumping at room temperatures.

Boiling point sufficiently above 300° C. to assure liquid condition at all times.

Stability against heat, plus an adequate safety margin to accommodate accidental overheating.

Other advantages: controlled vaporization loss, less corrosive action, freedom from toxicity hazard (in properly enclosed systems).

Other uses for Aroclor 1248: as plasticizers in specialty lacquers, adhesives, vinyls, as ingredients in E. P. lubricants, high styrene butadiene stucco finishes, chlorinated rubber coatings.

For more information about Aroclor 1248, check the coupon at right.



#### New! Petroleum Rust Inhibitor Booklet

How Santolene\* C helps the petroleum handling industry maintain product quality, cut overhaul and maintenance costs are just a few of the important subjects covered in this new 20-page technical bulletin.

Low concentrations of Santolene C, when added to light petroleum products, control rust and corrosion by establishing a film or barrier between metal surfaces and corrosive elements, preventing rust formation in tankers, pipe lines, storage tanks—in fact, almost all petroleum handling facilities.

For your copy of this informative booklet, write Monsanto today.

# Ethavan and Vanillin add flavor boost to chocolate coatings

Taste and odor testing is fast becoming an additional method of processing control in a variety of industries. Formulators of hard butter and cocoa butter coatings, in



particular, are discovering how Monsanto Ethavan\* (ethyl vanillin) and Vanillin can pep up the flavor of inexpensive hard butter coatings and smooth out the rich, full body of cocoa butter coatings.

Monsanto Vanillin and Ethavan, supplied in pure, fine crystal form, can be added to these coatings without diluting or lowering coating viscosity. Temperature extremes required for hot or cold processing do not affect Ethavan or Vanillin's flavor potency.

Test the quality of these two fine products yourself. A test kit containing three chocolate coating samples—a hard butter coating with Ethavan, a hard butter coating with Vanillin, and a cocoa butter coating with Vanillin—is tasty proof that Ethavan and Vanillin can give chocolates an important flavor boost so necessary for repeat sales.

For your test kit, check the handy coupon below.

\*Reg. U.S. Pat. Off.



810 North 12th Street, St. Louis 1, Mo.

MONSANTO CHEMICAL COMPANY

6/55

Serving Industry ... Which Serves Mankind

Please send:

- "Specify PENTA"
- "Reducing Costs by Handling Phthalic and Maleic Anhydrides as Molten Liquids"
- "The Handling of Phenol"

Ethavan-Vanillin taste test kit

- ☐ "Santolene C Rust Inhibitor"
- ☐ "Aroclors," Technical Bulletin No. OP-115

.....

ompany.....

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Long service life results with rubber compound . . .

resists outgassing at high temperatures

Uses: For sealing high vacuum devices such as electronic units, evaporators, electron microscopes, and other equipment.

Features: Chief advantages of material is its long service life in permanent installations and its resistance to outgassing at high temperatures.

Description: Compound is a special formula of Buna N polymer which can be injection molded in a wide variety of shapes of gaskets and other products.

(Rubber compound 366YV is product of Dept. KP, Minnesota Rubber and Gasket Co., Dept. CP, 3630 Wooddale Ave., Minneapolis 16, Minn. Check CP 7334 opposite last page.)

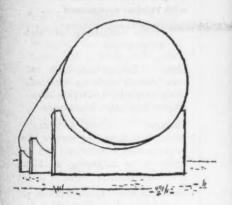


Freedom from sticking and ease of application are featured by silicone release agent for heat-sealing equipment. One spraying is effective. Parting surface is unaffected by temperatures ranging from -40 to over 400°F.

(Slipicone Spray is a product of Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. ... or for more information check CP 7335 on handy form opposite last page.)



For more information on product at left, specify CP 7336
. . . see information request blank opposite last page.



#### acetaldehyde-

pharmaceutical raw material denaturant chemical intermediate

#### crotonaldehyde-

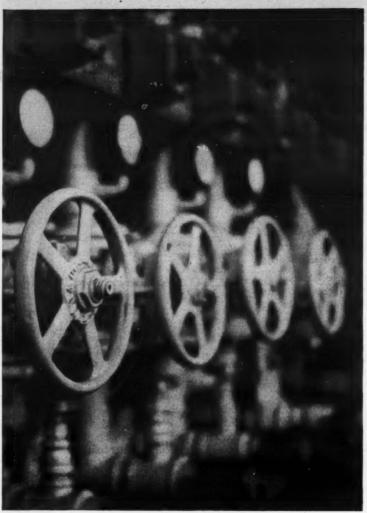
denaturant chemical intermediate specialty solvent

#### n-butyraldehyde-

chemical intermediate plastic intermediate pharmaceutical intermediate

#### isobutyraldehyde-

pharmaceutical intermediate resin raw material chemical raw material



Eastman

# aldehydes

CHEMICAL PRODUCTS, INC. KINGSPORT TENNESSEE a subsidiary of EASTMAN KODAK COMPANY For samples and information about Eastman aldehydes and other Eastman industrial chemicals, call our nearest sales office or write to Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York -260 Madison Ave.; Framingham, Mass.-65 Concord St.; Cincinnati-Carew Tower; Cleveland—Terminal Tower Building; Chicago—360 N. Michigan Ave.; St. Louis— Continental Building; Houston-412 Main St. West Coast: Wilson Meyer Co., San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland— 520 S. W. Sixth Ave.; Salt Lake City-73 S. Main St.; Seattle-821 Second Ave.

When inquiring check CP 7337 opposite last page

#### MATERIALS

#### **Epoxy resins and hardeners**

Uses of C-8 Epoxy Resins including casting, laminating, and adhesives are described in 16-page booklet. Data on storage life, handling, and compounding are given.

"C-8 Epoxy Resins and Hardeners" is issued by Bakelite Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 300 Madison Ave., New York 17, N.Y. When inquiring specify CP 7338 on handy form opposite last page.

#### Contributes to wear-resistance on non-rub emulsion floor polishes

Uses: As a wax in non-rub floor polishes of high soil and scuff resistance.

Features: High solidification point, the dry brittleness, high tensile strength and film-forming properties make it possible to replace carnauba, phenolic resins, and shellac in non-rub polish emulsions. High resin content of wax, in combination with Cardis One, contributes greatly to wear resistance of wax films based on abovementioned waxes.

Description: Sugar Cane Wax 700 has these specs:

Drop point melting point (°C)	76-79
Acid No.	25-30
Saponification No.	70-90
Needle Penetration	1.0-1.5
Isopropanol Soluble (% @ 80°C)	65-75
Color	Brown

(Sugar cane wax is a product of Warwick Wax Co., Inc., Subsidiary of Sun Chemical Corp., Dept. CP, 10th St. & 44th Ave., Long Island City 1, N.Y. . . . or for more information check CP 7339 on handy form opposite last page.)

#### Polyethylene-boron material is good neutron absorber for lightweight reactors

In the field of nuclear reactor design, as Uses: a neutron absorber.

Features: It is especially useful in design of reactors where weight is a particular factor, such as in aircraft and ships. When used with most common shielding material, forms a shield to prevent escape of rays from reactor core.

Description: Boronol is composed of polyethylene and various boron-bearing salts. Boric oxide is more commonly used as it is low in cost and easily handled. Boron carbide is used where high boron content is desired. Sheets have been manu-

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Reduces of vinyl formula

Uses: cosity and Features:

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Description

Color ( Viscosity Sp gr ( Refractiv Dosage is

(Viscosity & Chemic York 16, CP 7342

factured containing 60% B<sub>4</sub>C. Material is supplied in form of heavy sheets and large moldings. Molded material can be readily machined or welded, but not cemented with an adhesive.

(Boron-filled polyethylene is a product of Allied Resinous Products, Inc., Dept. CP, 525 W. Adams St., Conneaut, Ohio . . . or for more information check CP 7340 on handy form which is located opposite last page.)

#### It's easy to make these vehicles for use in odorless-type flat wall paints . . .

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offer excellent working properties, non-penetration, leveling, and durability

Developed specifically for use in odorless-type flat wall paints, vehicles are easy to prepare. They have more complete freedom from odor than is obtainable with conventional "odorless" vehicles, excellent working properties, leveling, non-penetration, and durability. Costs are very reasonable.

"Low odor" Epon resin-based vehicle A-300 provides scrub-resistance, superior non-penetration and holdout, and shorter cooking time. "Odorless" vehicle A-301 has lower resin content, complete lack of odor, and somewhat lower raw material cost.

("Odorless" paint vehicle formulation data are available from Shell Chemical Corp., Dept. CP, 50 W. 50th St., New York 20, N.Y. . . . or for more information about manufacturer's product reader may simply check CP 7341 on handy form opposite last page.)

# Reduces viscosities of vinyl plastisol formulations

Uses: In vinyl plastisol formulations to cut viscosity and aid in removing air bubbles.

Features: It reduces viscosity of plastisols having low plasticizer/resin ratio and particularly for those containing a large amount of fillers or pigments.

Description: Advawet X-212 has these specs:

Color (G-H) I-2
Viscosity (cps @ 25°C) 20-25
Sp gr (@ 20°C) 0.984
Refractive index (n<sub>D</sub><sup>20</sup>) 1.4528

Dosage is 1-2% based on total wt of plastisol.

(Viscosity reducer is a product of Advance Solvents & Chemical Corp., Dept. CP, 245 Fifth Ave., New York 16, N.Y. . . . or for more information check CP 7342 on handy form opposite last page.)



FOR QUICK DELIVERY of any Picco product whose use does not warrant carload shipment, Picco maintains ample stocks in strategically located warehouses. Material ordered in the morning is usually delivered that same day. Fast and effective service is paramount in Picco policy.

Picco warehouse stocks are available at the locations shown at the right. Picco products include complete lines of poly-terpenes, styrenes, paracoumarone-indene and synthetic petroleum resins, coal-tar products, solvents, solvent oils, rubber tackifiers and plasticizers, high-solvency naphthas, and rubber-reclaiming oils.

Full information and samples of Picco products available on request.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION

CLAIRTON, PENNSYLVANIA

Plants at Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.

District Sales Offices in New York, Philadelphia, Pittsburgh, Detroit and Chicag

When inquiring check CP 7343 opposite last page

# **CONTAMINANTS**

# are removed with

A variety of contaminants can be effectively removed with ADSORBITE activated carbon.

Gases and liquids can be purified to remove undesired impurities in your process or product you sell.

Write for full information, specifying your particular needs so proper samples may be submitted for evalua-

# BARNEBEY-CHENEY

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### GELLING and THICKENING AGENTS IMPROVED..



We manufacture laboratory controlled Water Soluble Gums and Starch Products. Our years of experience in developing and supplying these products for the most quality conscious firms in your industry, can be useful to you. Tell us your needs. Our modern line is sure to answer your problems.

WATER SOLUBLE SUMS
Agar-Agar
Gum Arabic
Gum Karaya
Locust Bean Gum
Gum Tragacanth
Lish Mass

New Orleans, Lauisia Oakland, California

CANADA

STARCH PRODUCTS
Arrowroot Flour
Potato Starch
Tapieca Flour
Instant Pudding Base
Precooked Starches
Dextrines—
Yellow and White

SEND FOR our Water Soluble Gum Inquiry Sheet. You fill in and return it for analysis and recommendations.

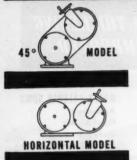
MORNINGSTAR, NICOL, INC. Scientific Starch, Bextrine and Natural Gum Service 430 West 51st Street, New York 19, N. Y. • Phone: COlumbus 5-2860 1770 Canalport Avenue, Chicago 16, Illinois • Phone: CAnal 6-2219

When inquiring check CP 7345 opposite last page

# REEVES

Fractional HP Motodrive





## **NEWEST DESIGN FOR** VARIABLE SPEED 112 ASSEMBLIES

to choose fromengineered to your exact requirements!

#### CHECK ALL THESE NEW, REEVES FEATURES

- New redesigned, more compact drive gives you speeds from 3 to 4660 RPM . . speed ranges from 10 to 1!
- 2 New "all-position," 14-turn handwheel gives operator sensitive, minutelyaccurate speed control from a position most convenient for the installation!
- 3 New "all-position" output shaft permits driving in any direction—horizontal
- 4 New spiral groove lubrication with exclusive overflow outlet provides complete lubrication of all sliding surfaces for trouble-free operation at all times!

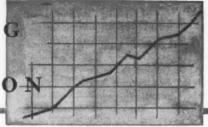
REEVES PULLEY COMPANY . COLUMBUS, INDIANA Division of Reliance Electric and Engineering Co.

> Send Today for Complete Information! Specify Bulletin CP7b-M543.



When inquiring check CP 7347 opposite last page

### EXPANDIN CHEMICAL PRODUCTIO



#### Polyethylene plant now on-stream at National Petro

Polyethylene resins, under the trademark of Petrothene, will be produced at the rate of 26 million lb/year at National Petro-Chemicals Corporation's plant now on-stream at Tuscola, Ill.

The Petrothene resins, available in pellet form, will be marketed by U. S. Industrial Chemicals Co., New York, a division of National Distillers Products Corporation, a joint owner of National Petro. They are produced by a modified ICI process from high-purity ethylene, obtained by cracking the ethane portion of natural

Included in the Tuscola plant is a Polyethylene Applications Section, established to assist customers with development and processing problems. Entire unit has been designed so the 26-million-lb output can be boosted to meet expected demand increases in the future.

#### More elemental phosphorus, sodium phosphates

Shea Chemical has announced plans to double present capacity for phosphorous and sodium phosphates. Four-step construction program calls for a second 20,000-ton furnace at Columbia, Tenn., a new phosphate rock plant nearby, a phosphate and phosphoric acid plant near Dallas, Texas, and enlargement of present plant at Adams, Mass. Completion is slated for the end of

Program outlined by Shea will cost more than \$5,000,000. Additional power from TVA (33,000 kw-hr) will bring capacity to 40,000 tons of elemental phosphorus annually.

#### Plan subsidiary to develop fluorspar resources

Pennsalt Manufacturing Co. has announced construction plans for a subsidiary - Calvert City Chemical Co. to develop extensive fluorspar resources in Western Kentucky.

New company, scheduled for operation later this year, will develop a new mine and expand existing milling and flotation facilities to meet requirements for acidgrade spar used in production of hydrofluoric acid and other fluorine chemicals at its Calvert City plant.

#### R-B-H Dispersions adds new facilities

New manufacturing and shipping facilities are being constructed at the Bound Brook, N.J., plant of R-B-H Dispersions Division of Interchemical Corp. Two buildings-for increased production and added warehouse space—are scheduled for completion in July.

#### **Davison locates catalyst plant** near Baltimore

Davison is planning to build a \$4,000,000 catalyst plant at Curtis Bay, Maryland near several large oil refineries which will use these products. New plant will be part of a modernization and expansion program for cracking catalysts undertaken by the Davison Division of W. R. Grace & Co.

Construction is under way. Completion should be about this time next year. Similar catalysts are made by Davison at Lake Charles, La. and Cincinnati.

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News about chemical materials in the US – plant construction, increased production . . . on stream now or planned for future

## Shell finds another way to make glycerine

Already supplying about one-quarter of all glycerine consumed in this country, Shell Chemical announced that it will use a brand-new approach to make glycerine from petrochemicals. Before getting into final stages, Shell will build two plants to make intermediates hydrogen peroxide and acrolein.

Work is starting now on peroxide plant at Norco, La. It will produce 30,000,000 pounds a year (equivalent 100% H<sub>2</sub>O<sub>2</sub>) in several grades. Later, acrolein and glycerine plants will be built.

While most of the peroxide and acrolein capacity is to be captive, some acrolein will be marketed. Shell is making samples available now to stimulate a market for it.

## Plan increased production of Foamglas

Pittsburgh Corning Corp. has announced a 1½ million dollar expansion program, with the immediate objective of increasing production of its Foamglas by 25%. Plans in this first step of the program include installation of a new production line and construction of a 50,000 sq ft warehouse at its Sedalia, Mo., plant.

#### Standard, Sinclair to build ammonia plant

A 300 ton/day ammonia plant, to be located in Hammond, Ind., will be built by Calumet Nitrogen Products Co., formed by Standard Oil Co. of Indiana and Sinclair for that purpose.

Ammonia will be produced from by-products of both companies, and both will market their portions separately. Completion is set for May, 1956.

## **Drug plant in Iowa City** for Procter & Gamble

Multi-million drug plant in Iowa City will produce shampoos, home permanents, dentifrices for -Procter & Gamble. First plant outside Cincinnati to produce P&G's full drug line, it will employ about 200 people. Fall, '56 is estimated completion date.

## Salt cake production upped 50,000 tons

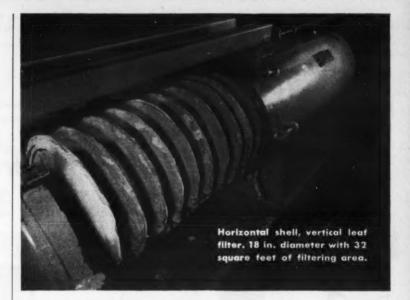
Starting from natural brine at Searles Lake, Calif., West End Chemical Co., will produce 50,000 tons a year of salt cake and anhydrous sodium sulfate. Production should be in full swing some time this summer. (Evaporator, key to the process, has already been installed.) Quality of the product is reported to be high because it is not by-product material.

#### Produce metallic silicon 98 per cent pure

Dow Corning has "poured off" 98 per cent silicon from a new furnace at Midland, Mich. Quartzite rock is reduced in the 6000 kva electric furnace with coke and charcoal. Resulting metal is ground and used as starting material for silicones.

## Forty tons of liquid fertilizer for Nebraska every day

Phillips Petroleum Company's whollyowned subsidiary Curry Chemical Company is beginning construction of a 40-tona-day liquid mixed fertilizer plant at Scottsbluff, Nebraska. Primarily a developmental facility, plant will be used to acquaint growers with mixed (phosphorus, nitrogen, potash) fertilizer techniques.



# This horizontal INDUSTRIAL Filter helped increase Hoffman lard sales

PROPER FILTRATION . BETTER PRODUCT . MORE SALES

Hoffman Brothers Packing Co., Los Angeles, found this filter a definitely profitable buy. They say that sales have increased to full production limit with the improved product.

#### 12,000 POUNDS OF LARD FILTERED BETWEEN CLEANINGS

The moderate size filter recommended by Industrial does a huge job. 5000 lbs. of lard is first run through the filter at 180°F. to remove the cracklings. Then 7000 lbs. of suet is processed at 200°F., filtering out cracklings and activated clay. The entire 12,000 lbs. of clear filtrate is produced before the filter is opened and cleaned.

#### "LIFT-OUT" LEAVES ARE EASY TO CLEAN

Industrial's horizontal filters can be opened and cleaned with unusual speed and convenience. The leaves are simply lifted out without any unfastening operation, cleaned, and dropped back into place.

#### INDUSTRIAL MAKES VERTICAL AND HORIZONTAL FILTERS IN MANY SIZES

A wide range of filters, from  $3\frac{1}{2}$  to 1950 square feet of filtration area, are available in materials and types suitable for any chemical processing. Industrial's research and engineering staffs are ready to help you with your problems.



Write for full details

## INDUSTRIAL

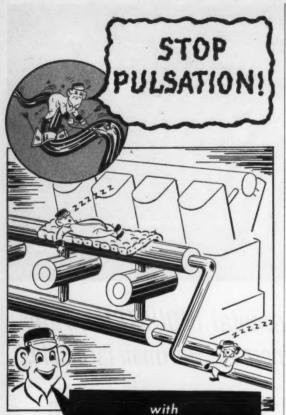
FILTER & PUMP MFG. CO.

5008 Onden Avenue a Chicago SO, Illinois

CENTRIFUGAL PUMPS PRESSURE FILTERS • 10N AND HEAT EXCHANGERS • RUBBER LININGS • WASTE TREATING EQUIPMENT

When inquiring check CP 7348 opposite last page

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BURGESS-MANNING PULSATION SNUBBERS

Burgess-Manning Pulsation Snubbers will remove one of your most aggravating and costly bug-aboos, that of line surges from compressors, pumps, blowers, etc. Maintenance and service costs will drop sharply—lines and associated equipment will operate at a new efficiency — flow control can be greatly improved. Structural supports of pipe lines need no longer be of costly and special construction — gas compressors and pumps will deliver full design flow with greatest efficiency in pulse-free piping.

Send us your specifications for recommendations

BURGESS-MANNING COMPANY

721 East Park Avenue, Libertyville, Illinois
Dallas, Texas

When inquiring check CP 7349 opposite last page

American Cyanamid announces new facilities at Warners, New Jersey

# provides source of new chemicals in medium-scale demand



Crystallization, liquid handling and reaction phases are carried on in this area

RALPH SCHMIDT, General Superintendent
New Products Department, American Cyanamid Company
Warners, New Jersey

with JOHN C. VAALER, Editor

More than twenty products now being produced — a source of larger-than-usual quantities of new chemicals which have not yet become commercial

Cyanamid's new facilities at Warners and Bound Brook, New Jersey, provides a means of producing a wide range of new chemical products. These are products too large for pilot plant and still too small for commercial production. Cyanamid's New Product Development thus has a means of bridging the development-to-commercial gap.

New chemicals can be evaluated in terms of longrange commercial possibilities. The time required to bring products from research into profitable commercial production will thus be shortened. Important economies in introducing new products to industry will minimize the risk that management takes when it decid In sett nature, sidered

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it decides on plant additions to produce new products. In setting up requirements for facilities of this nature, here are some of the things that were considered:

- Medium-scale demand from pilot-plant production requires too much use of developmental personnel and time.
- In any market development program, multipledrum quantities of new chemicals are required.
- Future success of an installation of this sort depends upon moving commercial products from this operation as quickly as feasible. This leaves room for newer processes.
- Processes may or may not be completely developed and further processing data might be required.

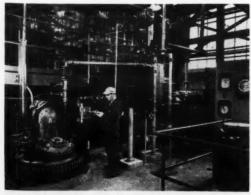
In the initial planning, about twenty processes of potential company interest were used to determine the types of equipment necessary. Flow sheets for these products were worked out and equipment was selected which gave several basic units. The philosophy in this planning was to permit wide flexibility which may be likened somewhat to an "over-grown pilot plant."

One of these basic units was located at Bound Brook, New Jersey. This installation provides equipment necessary for high-pressure reactions. Raw materials for this operation and any required purification of products are carried out in the Warners facility.

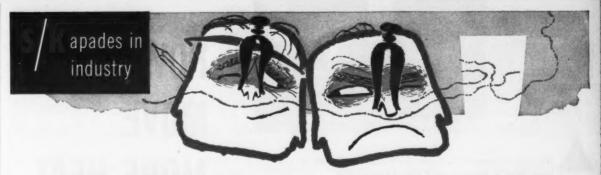
At Warners, the equipment employed provides broad flexibility in operation. Stainless-steel and glass-lined equipment was used wherever possible. Services include steam, water, brine, and vacuum. Basic equipment can be summarized as follows:

- A 500-gallon stainless-steel kettle, Arochlorheated to 250°C, provides for batch fractionation under vacuum and pressure. The kettle may also be used in high-temperature reactions.
- A 1500-gallon stainless-steel kettle is used for general batch-type reactions. It is equipped with a condenser for simple distillations. Aux-

(Continued on page 57)



Continuous unit. Reactants and feed are automatically controlled in correct ratio



# THE CASE OF THE PUNGENT POTS AND THE PROCESS MAN WITH A PLAN

"Gadzooks!" cried Pete the Process Engineer, as he clamped a clothespin on his nose. "I dever sbelled anythig as obdoxious as doze varnish keddles."

The kettles kept right on fuming—and so did the employees who had to endure the odor.

"Do somethig," gasped the Plant Manager.
"Those nauseatig fubes and odors are perbeating

the whole fagtory. Peoble turn up their dozes at working here . . . "

Pete went into his office and held his head. A jet unit would alleviate odors and pacify his disgruntled boss. A jet unit, but what kind? And what about hoods, ductwork, recirculating system? A jet unit? Yes! No fan to corrode or wear out...



Pete wrote Schutte and Koerting for a copy of new Bulletin J-1 on "Jet Apparatus and its Industrial Applications." That told him all he needed to know about the varieties, ranges and characteristics of Jet Apparatus.



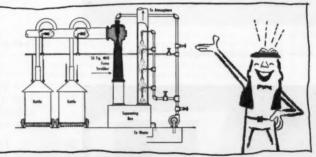
Builetin J-1 pinpointed the data he needed. He located the desired function, the types of Jets suitable for such a function, the type <u>most</u> suitable for his particular requirements.



Then he phoned for a specialist—his nearby SK Sales Engineer, who came a-running. And from him, Pete get a specific recommendation.

#### LICKED THE PROBLEM IN A JIFFY!

The SK Fig. 4010 Jet Fume Scrubber now removes fumes from a battery of four varnish kettles, washes these fumes and discharges clean air to atmosphere. Corrosion is no problem, since the scrubber has a fume-resistant lining. As a matter of fact, the fume scrubber has been operating successfully for over five years!



#### MORAL:

Send for a copy
of Bulletin J-1
for your files.
And make use of a
qualified specialist
on jet apparatus
—your nearest
SK Sales
Engineer.



2215 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus • Heat Transfer Equipment Strainers • Condensers and Vacuum Pumps Oil Burning Equipment • Rotameters Flow Indicators • Radiafin Tubes • Valves Spray Nozzles and Atomizers • Gear Pumps Desuperheaters

When inquiring check CP 7350 opposite last page

ING



Which lead pyramids will melt first? Those on the fireclay brick (left), or those on the CARBOFRAX brick?



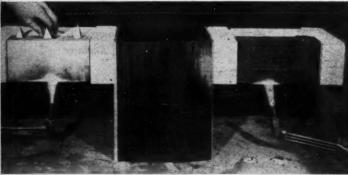


In minutes, heat passes through the CARBOFRAX brick...
melts the first sinker...now melts the second.





Here, the third sinker melts...despite angle of the torch.





Minutes later, the sinkers on the fireclay brick are still cool enough to touch.

# HOW TO MOVE MORE HEAT FASTER...

Here is visual proof of how much faster you can transmit heat through a CARBOFRAX® silicon carbide refractory than through fireclay. By test, 11 to 12 times faster...or about the same rate of heat transfer you get with chrome nickel steel.

When you move heat this fast...

...you save time. You reach operating temperatures faster. And you can quickly shift furnaces and process equipment from one temperature level to another.

...you get better results. This kind of heat conductivity gives you better heat distribution ...closer quality control ... increased production.

...you cut fuel costs. It takes less fuel to reach operating temperature...less fuel to stay there.

...you can also *dissipate* heat more rapidly. This is why CARBOFRAX refractories are used for set kettles, arc shields, stills and similar applications.

## Test also proves CARBOFRAX refractories resist intense heat!

The torch blasted a 1½" hole into the fireclay—yet it had no effect on the CARBOFRAX brick. A striking example of the latter's heat resistance and long-wearing qualities.

For more information write or phone us for your free copy of "Super Refractories." Address Dept. S65, Refractories Division, The Carborundum Company, Perth Amboy, N. J.

CARBORUNDUM

#### Making equipment for coke-oven gas purification

Coke-oven gas purification equipment designed for American chemical engineering practice but based on Dutch operating experience, is being produced in US. Company offering equipment has concluded an exclusive arrangement with Dutch State Mines of Holland for use of all technical know-how concerning the low-temperature process. Coke-oven gas may be used in US to produce ammonia synthesis gas, as has been the practice in Europe.

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(Coke-oven gas purification equipment is being offered by Air Products, Inc., Dept. CP, P. O. Box 538, Allentown, Pa. Check CP 7352 opposite last page.)

#### Low impregnation factor, higher potency featured in anti-static cloth

Anti-static wiping cloths, although commercially available for over two years, are now being made with a higher anti-static potency and lower impregnation factor. Chemical compound in cloth is non-evaporative and cloths can be used or stocked indefinitely without danger of deterioration.

Wiping an object with the cloth neutralizes static charges in the item and overcomes annoying and sometimes dangerous problems caused by static electricity. Cloth also prevents static-caused dust from forming on consumer items that must be displayed and kept clean. Standard cloth size is 16 x 16", but material is also available in rolls 34-36" wide.

(De-Stat Cloth XK is product of Globe Laboratories, Dept. CP, P. O. Box 853, Sherman Oaks, Cal. Check CP 7353 opposite last page.)

For more information on product at left, specify CP 7351
. . . see information request blank opposite last page.

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#### CYANAMID'S FACILITIES

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(Continued from page 55)

iliary to this kettle is a 2000-gallon stainlesssteel cone-bottom tank for crystallization, washing, and phase-separation operations. Coupled with this is a Votator which is used to increase heat transfer to viscous solutions. Also, the Votator can be used for crystallization.

3) Two glass-lined kettles, one 750-gallon and the other 1500-gallon, are provided for corrosive service. Smaller unit is equipped with a Karbate condenser.

4) Also, there is a stainless-steel continuous reactor of the shell-and-tube type, followed by continuous fractionating equipment. Facilities are provided for proportioning three reactants and for continuous control of exit pH. Reactor itself can be modified such that up to three reaction stages can be used.

5) Another continuous unit is available based upon a glass-lined kettle. Most of the features previously mentioned are included. This kettle is equipped with a Karbate heat exchanger and an all-glass condenser.

In addition to these basic units, several portable tanks, pumps, agitators, grinders, etc., are provided. Permanently installed are two dryers, one a doubledrum dryer and the other a rotary-tunnel type.

All the units are heavily instrumented for good quality control.

In all operations, production experience gain will permit Cyanamid to respond more quickly to largescale demand for new products. Availability for these facilities for products in relatively large quantities permits a sounder appraisal of market potentialities.

While the Warners plant actually provides the operating site and management for the over-all operation, all production scheduling is handled through Cyanamid's New Product Development Department. A similar arrangement is used for the Bound Brook

(Information courtesy of American Cyanamid Company, Dept. CP, 30 Rockefeller Plaza, New York 20, New York.)

#### Put your finger on ideas

. . . materials, equipment and services through our handy Product Directory, starting in this issue on page 214. This "quick-locator" lists all products, with page references.

# strikingly different

plus the help of NATIONAL starch research

# starch properties

# If you need a water repellent, free flowing starch . . . a starch with controlled swelling ability . . .

Leather...Cosmetics...Pharmaceuticals...Water Clarification...others

SPECIALIZED STARCHES for...Ore Flotation...Paper...Textiles...Foods

a starch with the unique combination of emulsifying and thickening powers . . . any other properties We're starch specialists. Our research laboratory is constantly exploring ways to derive new

products from starch by truly chemical means: the introduction of new chemical groups or radicals into the starch molecule. The resulting molecules have an entirely new structure and exhibit strikingly different properties—which will find applications far afield from the present uses of starch products.

Our starch research staff is ready to match its time with yours in developing special starch properties or in applying developed starch properties to your products.

DRY FLO powder,
a derivative of ungelatinized
corn starch, is free flowing,
water repellent and easily
suspended in organic solvents.
USES: Dusting powder, fluidi-
fying agent, lubricating agent,
detackifier, emulsifier.

EXAMPLES

A FEW

BRIEF

VULCAS are modi	
fied starches with controlled	
swelling ability. They are	
supplied with varying degree	1
of granule toughness.	
<b>USES: Inert nontoxic dusting</b>	
powder, thickener for foods,	
cosmetics, in dry cells.	

NAPONS are chemically treated starches with the unique combination of emulsifying and thickening properties, USES: Textile, paper-tub or calender sizing, cosmetic emulsions, ore flotation.

CATO STARCH is a cationic starch with high affinity for cellulose fibers. It improves the strength factors of paper and still permits high machine speeds. USES: Headbox additives, ore flotation, sizing, thickening agent.

CM STARCHES are soluble in cold water and mix readily without lumping. They have good filming properties and impart grease or water .. resistance. USES: Tub sizing, calender sizing, coatings, beater and headbox additives.

AMIOCA, a 100% amyloypectin starch, gives clear, cohesive, nonjelling properties to pastes and films. Pastes are unique in the ability to recover original properties after freezing. USES: Textile sizings and finishes, paper sizings and coatings, foods.

NU-FILM carbohydrate derivatives contain hydrophilic groups. They have lowered gelatinization temperature, excellent stability and rinsability. USES: Thickening agent, finger paints, pharmaceutical lotions, leather pasting, laundry starch, textile warp sizes.

V CHECK THE STARCHES you'd like to know more about for use in:



STARCHES · RESYNS® · ADHESIVES

Address: NATIONAL STARCH PRODUCTS INC.

270 Madison Ave., New York 16 • 3641 So. Washtenaw Ave., Chicago 32 • 735 Battery St., San Francisco 11 • and other principal cities.

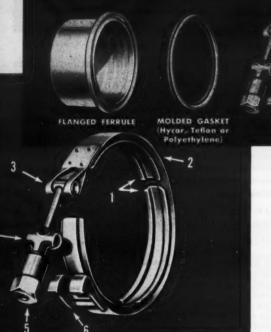
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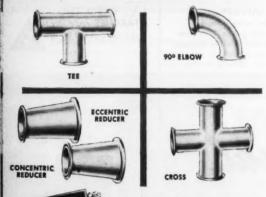
... with the NEW

# TRI-GLAMP

Schedule 5-10 and Tube O.D.
STAINLESS STEEL
INDUSTRIAL FITTINGS



Tri-Clamp Industrial Type Stainless Steel Fittings are available in all standard types, in sizes from 1" through 12". Fittings are fabricated from type 304 and 316 stainless steel, and sizes through 4" are annealed, pickled and passivated.



Send for NEW Bulletin . .

Complete details on TRI-CLAMP Industrial
Type Stainless Steel Fittings are covered
in the new Bulletin 1055. Send
for your copy now.



FLANGED FERRULE

1. RETAINER SECTIONS grip flanged ferrules securely, assures proper alignment.

TRI-CLAMP

- 2. TENSION BAND equalizes pressure around joint, holds clamp in position for quick connection.
- 3. TRUNNION is of simple design, provides fast locking and unlocking action.
- 4. "T" LATCH assembly easily snaps into position in Coupler (6) and is held in position by tightening nut (5).
- TENSION NUT, easily tightened with ordinary hex wrench.
- 6. COUPLER SEAT, holds Latch securely in place to complete positive, leak-tight joint.

As illustrated, the TRI-CLAMP Joint consists of a flange type ferrule—a special precision molded gasket which fits into the grooved ferrule lip—and the TRI-CLAMP itself, which is composed of a specially fabricated spring clamp which grips the ferrule edges, and a simple, bolt-type coupler assembly firmly secured to the clamp ring...always in position for instant assembly or disassembly.

All that is necessary for installation is to attach the ferrules to stainless steel tubing or pipe, insert gasket into position, slip TRI-CLAMP over ferrules and gasket and tighten into closed position—to produce a positive, leak-tight joint.

TRI-CLAMP Stainless Steel Fittings offer an entirely new concept of fitting design and fabrication, offering much greater speed and ease of installation, together with appreciable savings in original investment cost, and longer trouble-free life for many types of corrosion-resistant liquid conveying line service.

See your nearest Tri-Clover distributor, or write:

TRI-CLOVER Tri-Clover Division
Kenosha Wisconsin

IDEAS

# Survey indicates tougher odor-control regulations in the making . . .

officials report public interest, complaints rising

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JUNE, 1

Survey conducted among law enforcement officials in 67 major industrial cities indicates that public demand will force more stringent regulation of firms that cause unpleasant odors and furnes. Of the 77 per cent response, 62 per cent reported specific plans to intensify enforcement efforts. Total of 68 per cent declared that public interest in odor problems is increasing, and over 40 per cent said that complaints are rising.

According to the officials, industry is the major source of odor and fume problems, although vehicles and domestic causes also rank high. In order of frequency of mention, these are the prime sources of odors and fume complaints: chemicals, vehicles, paint and varnish, food processing, domestic causes, rendering plants, plastics, oil refineries, coke works, rubber, steel, insulation, fish, gas works, pharmaceutical, soap and detergents, breweries.

Large majority of the officials declared that industrial firms in their area had found it both difficult and expensive to solve odor and fume problems. This, combined with a lack of objective, scientific standards on which to base regulation, has resulted in a relatively lenient enforcement up to now.

Most of the respondents stressed need for more research into causes and cures. General satisfaction was expressed toward practically every well-known method for industrial odor control, although many officials indicated lack of personal knowledge of these techniques.

(Survey was conducted by Pendray and Company, Dept. CP, 55 West 42nd Street, New York 36, New York.)

 $\Diamond$ 

For more information on product at left, specify CP 7355 . . . see information request blank opposite last page.

EXPORT DEPT., 8 So. Michigan Ave., Chicago 3, U.S.A.

# Continuous diffusion of sugar cane piloted in Florida

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process features 97% extraction, purer juice, reduced operating costs

Successful operation is reported for a pilot-scale continuous diffusion tower extracting sucrose from sugar cane at Fellsmere Sugar Producers Association, Fellsmere, Fla. Unit is countercurrent: hot water (190-210°F) flows down while sliced ½" thick cane chips, in recycled juice, flow up. By osmosis, dissolved sucrose passes through cane cell walls into the hot water. Hot sugar solution and exhausted cane are withdrawn continuously.

Many advantages are reported for the process, based on pilot plant experience. Up to 97% of the sucrose in the cane is extracted. Purity of extracted juice is two to three per cent higher than conventional juice. Total power requirements are 1/3 to ½ those of tandem mill train of equal capacity. Capital investment is estimated to be about ½ that of an equivalent mill train. Maintenance costs could well be down to 25% of that for a tandem mill of like capacity. Operating costs can be reduced sharply because of process simplicity, automatic control.

Tower is vertical cylinder, within which is series of slowly-rotating (50-100 fpm peripheral) helical scrolls carried on central shaft. Flights of scrolls are interrupted periodically to accommodate fixed members, called arrestors, which extend inwardly from shell and serve as baffles. Pilot unit measures 3' diam x 45' high; plant units are expected to approach 10' diam by 60' high. This is about half the area occupied by presently-used tandem mills. Pilot unit processes about 150 tons cane per day — plant scale unit is expected to reach 1500 tons/day.

Exhausted cane chips contain about 85% moisture. They can be dewatered to less than 50% if they are to be used as fuel.

(Diffusion tower is development of National Cylinder Gas Company, Dept. CP, 840 N. Michigan Ave., Chicago 11, Ill. . . . check CP 7356 opp. last page.)

THAT'S INTERESTING

Rinse with positive charge puts fluff in wash

A. E. Staley Mfg. Co. of Decatur, Ill., has come up with another washday aid . . . a laundry rinse, Sta-Puf, which carries a positive charge to repel dirt (which has a positive charge, too) and make the wash fluffier. A little in the rinse water also helps keep baby happy by taking the coarseness out of diapers . . . and inhibiting the growth of the bacillus ammoniagenes, a diaper-rash-causing bacteria.



When inquiring check CP 7357 opposite last page

## Selection of samples in quality control

Basic concepts of random sampling and the reliability and significance of certain statistical measures are discussed in 63-page report. Size of sample necessary to insure significant experimental results is presented with set of graphs for determining minimum size sample to be taken for various statistical measures. Confidence limits are also discussed as a measure of reliability.

To obtain Report PB 111538, "Statistical Inference, Reliability, and Significance," remit \$1.75 direct to Office of Technical Services, US Department of Commerce, Washington 25, D.C.

# Diammonium phosphate replaces ammonium sulfate as by-product from coke ovens...

only minor changes needed in production facilities in order to make change-over

Reported to be first major coke oven operator to make change-over, The Colorado Fuel and Iron Corporation is now producing large quantities of diammonium phosphate (instead of ammonium sulfate) as a by-product. The switch, made with



Saturators (on either side of brick structure) are used to react the ammonia in coke oven gas with phosphoric acid to produce diammonium phosphate. Same equipment formerly produced ammonium sulfate

the technical collaboration of Monsanto Chemical Company and Koppers Company, Inc., was carried out at the company's Pueblo, Colorado, mill, and required only a few minor changes in existing production facilities.

Principal changes were in acid handling and storage facilities. Two 3/16" neoprene-lined tanks, each with a capacity of 20,000 gallons, were installed to store phosphoric acid—which replaces sulfuric acid used for removing ammonia from oven gases. Pipe carrying acid is made of plastic.

FLOW CHART - FOR THE PRODUCTION OF NAVAL STORES FROM WOOD CHIRS

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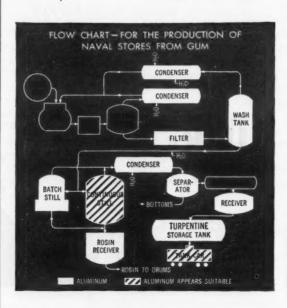
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APPEARS SUITABLE

NAVAL STORES are widely handled in ALCOA Aluminum equipment. Aluminum is used for gum cups, drums and tanks for shipment of final products. Aluminum resin kettles, evaporators, storage tanks, transfer lines, distillation equipment and piping are in service.



Handling
Do it better.

ALCOA Aluminum offers many advantages to the pulp and paper industries

**ALUMINUM SULFATE** (alum) is handled in aluminum cooling trays to avoid produc contamination. The rate of attack is low a room temperature and varies directly with acidity and temperature. Aluminum piping for alum solutions is also used in the paper industry.

HYDROGEN PEROXIDE is widely handled in ALCOA Aluminum. It is preferred material for handling and shipping hydrogen peroxide all commercial concentrations, including 90% hydrogen peroxide. Aluminum distillation towers, heat exchangers, storage tanks, piping tank cars and shipping drums are in service.

ROSIN has no action on ALCOA Aluminum Aluminum does not catalyze the discoloration of rosin.

WAXES have no action on ALCOA Aluminum. Molten wax is molded in aluminum pars. Aluminum tubed "wax sweaters" are used in the manufacture of wax.

ALCOA's development engineers have firsthand experience with hundreds of such applications. To get in touch with them, simply write (on your company letterhead) to:

ALUMINUM COMPANY OF AMERICA 902-F Alcoa Building, Mellon Square Pittsburgh 19, Pennsylvania che

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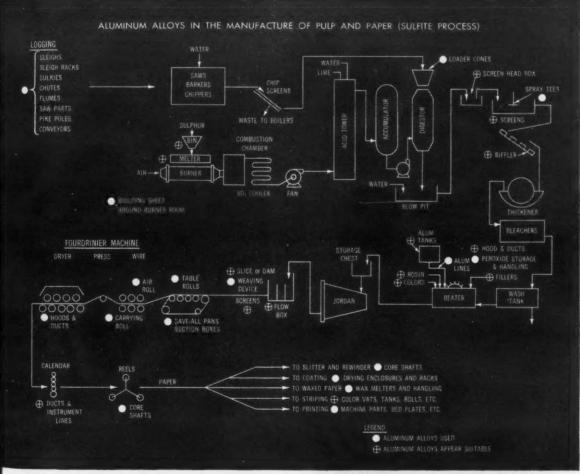
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# pulp or naval stores?

cheaper...with ALCOA ALUMINUM



Write today for our new, FREE 80-page book, Process Industries Applications of Alcoa Aluminum.



When inquiring check CP 7358 opposite last page

Stainless steel constant-level feed tank simplifies the addition of acid to the mother liquor.

Most of other changes involved control. Acidity



Two 20,000 gallon tanks are used to store phosphoric acid (electric furnace grade)

must be controlled in a fairly narrow pH range, slightly on acid side. Special attention must also be given to sp gr, temperature, water content, and crystallization conditions.

Used as fertilizer, diammonium phosphate has a 21-53-0 analysis, and can be used either dry or dissolved in water. Drying the material is easy. It requires no washing or neutralizing. Product's

lack of hygroscopicity also reduces caking.

(Information courtesy of The Colorado Fuel and Iron Corporation, Dept. CP, 575 Madison Avenue, New York, New York.)

#### Kraft mill odors reduced 90% by use of "vaposphere"...

unit collects non-condensible gases that get past standard odor-removing equipment

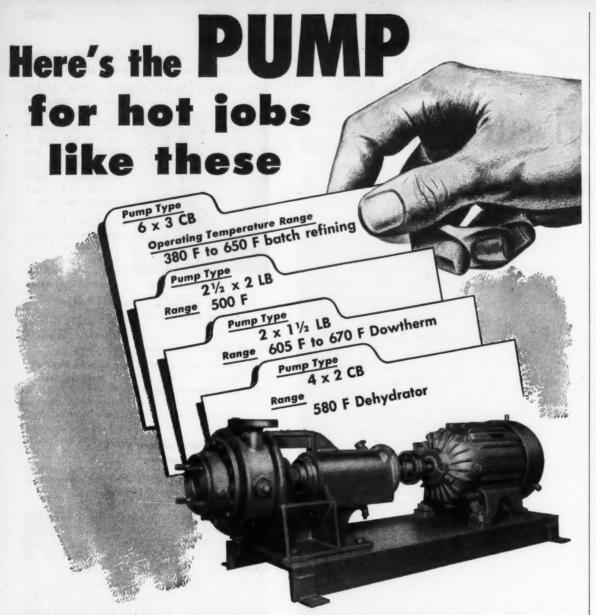
Odors from kraft pulp mill at Everett, Washington, have been reduced 90 per cent by use of a 27'-diam steel "vaposphere". Mounted on top of the digester building, sphere collects the minute quantities of odorous gases that escape standard equipment.

Most of the odorous gases produced at the digesters and evaporators are eliminated by condensers. Further odor control is obtained by oxidizing the spent black liquor before it is disposed. Sphere, which has a plastic diaphragm mounted inside of it, serves as a surge chamber for holding and collecting the noncondensible gases that get by other equipment.

As gases enter vaposphere, the plastic diaphragm swells up slowly, like a balloon, as it stores the gases. Unit receives a charge of digester gases about every 45 minutes. Collected gases are withdrawn from tank and sent to bleach plant where they are destroyed by residual chlorine in the chlorination waste water.

Company has similar unit installed at its Springfield, Oregon, mill, but since there is no bleach plant, the gases are withdrawn from the vaposphere and burned in a furnace.

(Vaposphere was developed by Weyerhaeuser Timber Co., Dept. CP, Tacoma Bldg., Tacoma 1, Wash.)



ALIS-CHALMERS oil-lubricated pumps have excellent service records on many types of high temperature applications like those shown here. This pump is of simple design, yet has all the features required for low cost, low maintenance operation at high temperatures.

Check the design and construction features that make this possible:

- Built in a wide range of ratings . . . capacities to 3500 gpm, heads to 400 feet.
- Available in wide choice of materials, including iron, bronze, aluminum bronze, stainless steel, high nickel alloys and others.

- Jacketed casing and stuffing box and water-cooled bearings optional.
- Adaptable for packing, mechanical seal or both.
- Simple, accessible design makes maintenance easy.

Allis-Chalmers can supply you with a complete pumping unit — pump, motor and control — all of coordinated design and manufacture and delivered assembled and ready to install. Get complete information from your Allis-Chalmers District Office, or write Allis-Chalmers, Milwaukee 1, Wisconsin, and ask for Bulletin 52B7638.

(AC)

# **ALLIS-CHALMERS**

When inquiring check CP 7359 opposite last page

# Test panel at United Nations cuts manhours, repair costs on electrical items . . .

checks motors, heaters, relays, thermostats, switches, lamps, coffee makers

As a means of cutting down on manhours and repair costs for electrical equipment, test panel at the United Nations building in New York City can accurately test hundreds of different types of electrical equipment — from coffee makers to intricate motors. Measuring 4 x 8 ft, the panel has proved its value over the past three years. Equipment can be checked, tested, repaired, and returned to service in fraction of time and cost it would take to send it out for repairs.

Source of energy is 3-phase, 4-wire, 120/220 volt set-up with Autrastats (Ward Leonard Electric Company's variable autotransformer) in each phase. Fuses in main lines protect feeders, and thermal cutouts limit the current to protect meters, transformers, and related equipment. Board is energized with a magnetic switch operated by a



Test panel at United Nations building is used to check hundreds of different kinds of electrical equipment

foot treadle. This permits both hands to be free. Board is dead when foot is removed from treadle, eliminating possibility of operator walking off and leaving live wires or equipment.

Voltages of 1 to 220 volts may be obtained from the line directly, adjustments being made with Autrastats. Higher voltages of 500 to 5000 volts may be obtained from built-in transformers. Voltmeters and ammeters are built into each phase and provide immediate check on any equipment.

Capacitors of 400 mmf to 40 mf may be measured directly on built-in bridge. Multiple series lamp arrangement can be used for testing lamps, fuses, motor windings, relays, and heaters. Tapped transformer supplies circuit of  $2\frac{1}{2}$ , 5, 6, 12, and 24 volts. Circuit is equipped with bell and buzzer for probing low-voltage windings and continuity

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Pont de Nemours

More the Grace of the contact of the

checks. Four-color wiring diagram painted directly on test board permits even relatively inexperienced persons to trace wiring of circuit in use.

Although designed specifically for United Nations building, there is no reason why panel (on smaller scale, perhaps, cannot be adapted for industry.

(Designed by B. Eichwald and Company, Inc., Dept. CP, 237 East 39th St., New York, N.Y.)

#### Paper made from synthetic fibers three to ten times stronger than pulp product

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Paper produced experimentally from synthetic fibers is reported to be three to ten times stronger than the conventional pulp or rag product. Made from Nylon, Dacron polyester, and Orlon acrylic fibers, product is said to cost more to make, but this is expected to decrease as use of the paper increases.

Material resists chemicals, bacteria, moisture, and light. Resistance to folding is said to be 200 times that of conventional paper. Suggested uses for product include heavy-duty bags and filtering media.

Manufacturing procedure consists of cutting the synthetic fibers into short lengths, slurrying with water, and forming into sheets on wire screen. Sheets are then dried and impregnated with an inorganic salt (such as calcium bromide) or with synthetic polymers similar to fibers being bonded. After impregnation, material is heated and pressed.

(Synthetic fiber paper is development of E. I. du Pont de Nemours and Company, Inc., Dept. CP, Nemours Building, Wilmington 98, Delaware.)



More than 28,000 hp of motors power equipment at Grace Chemical Company's 20 million dollar plant near Memphis, Tennessee. Total of 21,000 hp alone is contained in six motors (three 3000-hp, three 4000-hp) operating compressors of nitrogen, air, and methone. View above shows close-up of a 3000-hp synchronous motor driving a compressor. Plant can produce 250 tons anhydrous ammonia, 150 tons urea daily.

(Information courtesy General Electric Company, Dept. CP, One River Road, Schenectady 5, New York.)



Insulated, surface-finished walls erected in only one operation with dual-purpose blocks . . .

cellular-glass product provides impact-resistant surface, is moisture-proof

Thanks to the development of a cellular glassblock insulating material, walls can now be erected insulated and surface-finished — all in one operation. Known as "Duraface Foamglas", the material provides an impact-resisting surface along with high insulating and moisture-proof qualities. Being inorganic, it will not rot or deteriorate and is not affected by fungus.

Made of pure glass, material is resistant to nearly all chemicals. A hard white crust (about 3/4" thick) on the surface, provides finish coating.



Dual-purpose cellular glass blocks are made from two mixtures of chemicals and pulverized glass (shown lower left)

While surface needs no paint or other finish, various paints can be applied, if desired.

Dual-purpose insulation blocks are manufactured by integrally fusing the dense face with regular Foamglas. Two batches of pulverized glass and chemicals are placed into a covered stainless steel pan. One batch, white in color, is placed in bottom of pan. It contains chemicals which form smaller cells in molten glass, making the dense face. Other batch, dark in color, is compound used for making regular Foamglas. It goes on top of white batch.

Pan travels through cellulating oven (at about 1700°F) for approximately 80 minutes. Critical factor is timing cellulation of white batch with dark so entire block will be uniform and layer of ceramic dense face material integrated with standard material. After block leaves furnace, it is trans-

# NEW LUNCOR PVC VALVES DEF

The first all-molded PVC valve designed and engineered by a valve manufacturer



JUNE, 19

well as

# ESIDEFY INDUSTRIAL CORROSIVES!

... because Firestone Exon 402-A, base resin for

the Luncor PVC valve, makes it corrosion-resistant, as well as odorless, tasteless, non-porous, non-contaminating and electrically non-conducting!

**EXON 402-A** 

One-sixth the weight of metal, unplasticized polyvinyl chloride made from EXON 402-A resin can be molded to precise tolerances.

Developed by Firestone, this resin meets Lunkenheimer's exacting specifications for their new Luncor PVC valves and fittings. This is your best assurance of uniform results under the most corrosive conditions.

Now complete piping systems of unplasticized PVC are made possible, saving money both in installation and maintenance.

Made from EXON 402-A, this new material of construction is used in a wide variety of products and installations. It is making corrosion a memory in industry all over America. Study your costs-then call Firestone.

Firestone

If you have a corrosion problem in your plant, call or write: CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, POTTSTOWN, PA., DEPT. 8N DIVISION OF THE FIRESTONE TIRE & RUBBER COMPANY

When inquiring check CP 7361 opposite last page



Block's hard white crust (about 34" thick) provides finished surface, needs no paint, will not rot or deteriorate

ferred to an annealing oven where it spends from 12 to 14 hours cooling under standard, controlled temperatures.

Standard size is 18 x 12". Thicknesses are 3 and 4", depending upon amount of insulation required. Blocks can be installed with either straight or staggered joints. Hot asphalt or a cold adhesive may be used.

(Duraface Foamglas blocks are product of Pittsburgh Corning Corporation, Dept. CP, One Gateway Center, Pittsburgh 22, Pa. . . . or for more information about this product reader may simply check CP 7362 on convenient Reader Service slip located opposite last page.)

#### Have You Wondered Why ---

a manufacturer's name and address appear at the end of many articles . . . ?

The "source" of editorials, which we indicate by publishing a company name and address at the end of many articles, is not "advertising" for the manufacturer. It's put there as an editorial service to help you get more information on processes, materials, ideas, and equipment which interests you.

It also helps us to decide, from your response, which subjects you want most in CHEMICAL PROCESSING. Our handy Reader Service slip, located opposite the last page, helps you to get the details you want in a hurry . . . helps us get the best stories in lining up future issues.

THE EDITORS

JUNE, 1955

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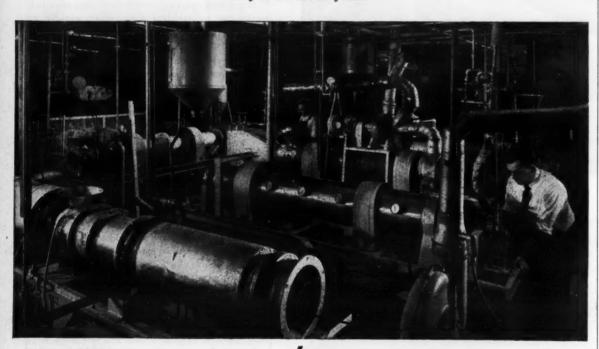
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IDEAS

# In our lab, small Louisville Dryers solve big drying problems for customers

Here's where Louisville Dryer performance is proved before you buy. In our East Chicago pilot plant, pilot dryers duplicate on a small scale the exact conditions of any drying process. From their operation, our drying specialists get the answers to questions like these: What size should it be? Which dryer type is best? What special design features will improve operation? What experience from our thousands of installations can best be applied to this problem?

Advance testing in our pilot plant is just one of the steps we take to make sure every Louisville customer gets more than satisfactory results. From initial surveys by drying engineers to follow-up checks after installation, Louisville insures maximum performance from your dryers. Why not take advantage of these facilities? A Louisville engineer will be glad to look over your drying operation. There's no obligation... and the savings that may result are all yours.





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over 50 years of creative drying engineering

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Other General American Equipment: Turbo-Mixers • Dewaterers Towers • Tanks • Pressure Vessels

For dependability see General American—creative engineering, design, construction, installation

### Flexibility, low severity featured in new reforming process . . .

uses solvent extraction, recycling to make 100octane gasoline with preselected characteristics

New catalytic reforming process not only produces gasoline of 100-octane or more, but is flexible enough to permit refiners to select their own octane number. This "Rexforming" process uses mild operating conditions and established refinery unit operations.

Feed may be straight-run naphthas, straight-run or cracked stocks (purified by the Unifining process), or mixtures. Stock is initially fed to a reboiled prefractionator which removes overhead a light gasoline fraction. Side cut from column enters a reaction section which contains a platinum catalyst and produces an effluent having an octane number of 75 to 85 clear, containing 35-45% aromatics.

Reactor effluent, after cooling, goes to a separator for removal of hydrogen gases. Separator liquid then passes through a stabilizer (acts as debutanizer) and into an extraction column. Low-octanenumber components are rejected from the top and returned to mix with fresh feed, achieving selective conversion of low-octane heavy paraffins to high-octane components.

Separation in the extractor is selective in that the higher boiling non-aromatics are the least soluble in the solvent. Aromatics and lower boiling non-aromatics (both are high-octane components), being relatively more soluble, are removed from the extractor with the solvent. Dissolved hydrocarbons are removed from the solvent by stripping, yielding a gasoline of well-balanced boiling range as the high-octane product (contains 60-65% aromatics when 100-octane clear).

Use of solvent extraction coupled with recycle of low octane material results in a water-white gasoline of controlled volatility characteristics. Due to the mild process conditions employed (about 50°F lower than for one-pass operations), side reactions are minimized, catalyst life is extended, and over-yields are high at super-octane levels.

Recycle nature of the process provides an additional process variable which frees refiners from operating limitations imposed by characteristics of their feed stocks. For instance, low-naphthene feeds can be processed as conveniently as stocks of more normal naphthene concentration, as the process permits more desirable paraffin conversions than are possible in single-pass operations.

It is estimated that an installation of this type will cost about \$300.00 per bbl to build and about 36c per bbl to operate.

(Rexforming process was developed by Universal Oil Products Company, Dept. CP, 30 Algonquin Road, Des Plaines, Illinois . . . or for more information check CP 7364 opposite last page.)

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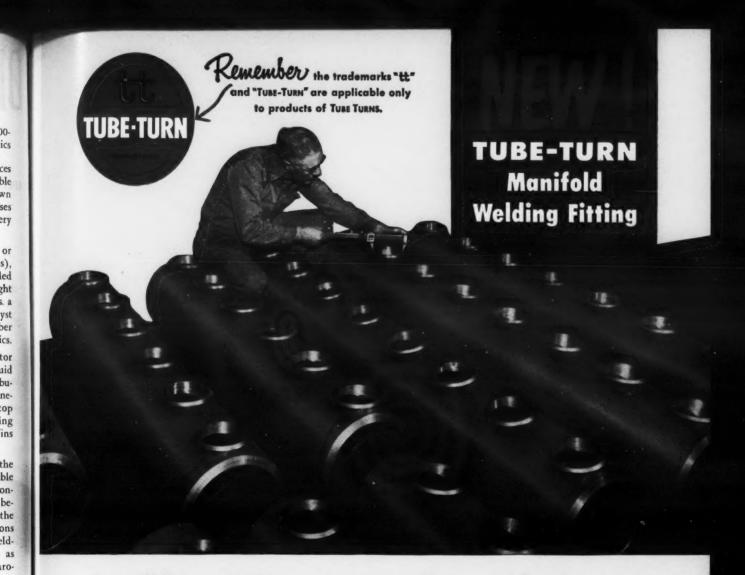
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## simplifies piping construction, reduces costs

TUBE TURNS now offers custom-made Manifold Welding Fittings with size, wall thickness, and number of outlets as required by your service conditions. These manifold fittings are available in all commercial metals and alloys.

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Use of TUBE-TURN\* Manifold Welding Fittings provides stronger and safer outlet connections than are possible when pads and saddles are employed. This new fitting makes possible greater economy and speed of construction in many

types of service. It is particularly useful when outlets are smaller than one-half the run pipe diameter, when they are extremely close together, or when they must vary in size.

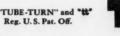
This new addition to Tube Turns' line enables you to "specify TUBE-TURN" for all your tee and manifold fitting requirements. For prompt, helpful service, get in touch with your Tube Turns' Distributor. You'll find one in every principal city.



The new TUBE-TURN Manifold Welding Fitting . . . superior to pad and saddle construction . . . easy to install . . . dependable in service.

LOUISVILLE 1,

TUBE-TURN Welding Fittings and Flanges are made in U.S.A. They meet all U. S. piping code specifications

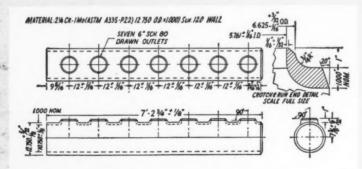


KENTUCKY

A Division of National Cylinder Gas Company DISTRICT OFFICES: New York . Philadelphia . Pittsburgh . Cleveland . Detroit . Chicago . Denver . Les Angeles San Francisco - Senttle - Atlanta - Tulsa - Houston - Dallas - Midland, Texas

# Why TUBE-TURN Manifold Welding Fittings give you safer service

In conventional pad and saddle construction, the transition to the side section of the branch is abrupt, creating stress concentration, often leading to failure. The TUBE-TURN\* Manifold Welding Fitting with *integral extruded outlets*, is superior in strength. It provides a smooth transition from the pipe run to the smaller, thinner-walled outlets, and is thus better able to withstand cyclic stress from pressure or temperature changes.



12" Manifold with Seven 6" Outlets. Schedule 80.



TUBE-TURN Manifold Welding Fitting being installed in a measuring station of a large west coast gas utility.

#### CODE APPROVED

TUBE-TURN Manifold Welding Fittings are in full accordance with the latest recommendations of ASA B31.1 Subcommittee No. 8.

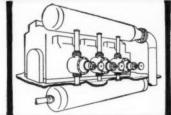
TUBE-TURN Manifold Welding Fittings comply with the requirements of ASA B16.9 and ASTM A234 covering the design and manufacture of butt welding fittings.



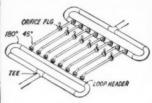
"UBE-TUR'N Manifold Welding ittings can be used in virtually ill types of major piping sysems. Tube Turns' Sales Developnent Department will be glad to assistyou in application problems.



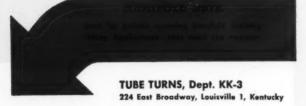
Pipe Still or Charge Heater



Compressor Station Suction and Discharge Headers



Meter Run Loop Header



Please send bulletin on new Manifold Welding Fittings.

Company Name \_\_\_\_\_\_ Company Address \_\_\_\_\_\_ Zone \_\_\_\_ State \_\_\_\_\_ Your Name \_\_\_\_\_ Position \_\_\_\_\_



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\*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

## **TUBE TURNS**

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### Plate-coils easily descaled by "shocking" . . .

steam followed by water knocks off deposits formed in operation

Plate-coil heaters used in industrial heating applications not only provide efficient heating, but they can also be descaled easily by shocking — that is, running

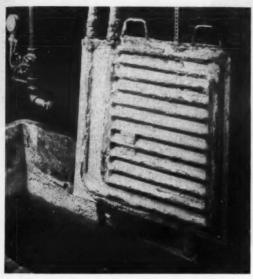


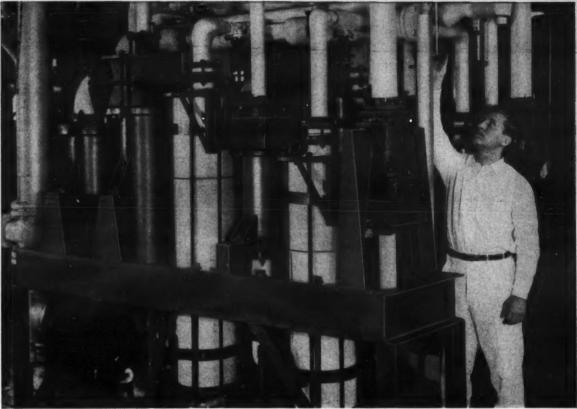
Plate-coil used for heating 110-gal phosphatizing tank has been in daily use for over a year without being removed. Scale deposits are "shocked off" when steam pressure is dropped after work day

live steam through them followed by cold running water. Rapid contraction of the accordion-like metal surfaces of the unit "shocks off" deposits, and saves time, trouble, and expense of removing heat-transfer units for cleaning.

An electro-polished stainless-steel 22" x 23" platecoil, used for heating a 110-gal phosphatizing tank, has been operating daily for over a year without being cleaned or repaired. Any deposits that build up during course of operation are shocked off when steam pressure is dropped in coil at the end of each working day.

(Plate-coils are product of Tranter Manufacturing, Inc., Dept. CP, 735 E. Hazel Street, Lansing 4, Michigan . . . or for more information about manufacturer's product, reader may simply check CP 7365 on convenient Reader Service slip which is located opposite last page.)

For more information on product at left, specify CP 7366 . . . see information request blank opposite last page.



FOUR-STAGE WORTHINGTON STEAM JET EJECTORS of impervious graphite, with two porcelain barometric intercondensers at Pfizer plant. Ejectors are used to maintain vacuum in vitamin A synthesis.

# Worthington steam jet ejectors maintain vacuum under corrosive vapor attack at Pfizer

Exhibit A in the case for Worthington steam jet ejectors is this installation at Chas. Pfizer & Co. plant in Groton, Conn.

Two years ago these Worthington units replaced rotary vacuum pumps assigned to maintaining a steady vacuum for a distillation process in the manufacture of synthetic vitamin A. This constant vacuum of 1 mm (equal to 0.04 inches of mercury) must be held for two days, the period of processing. When corrosive vapors showed up unexpectedly in the process, the rotary vacuum pumps just couldn't take it. These vapors have no effect, however, on the Worthington ejectors which

are designed specifically to function reliably under the toughest kind of corrosive conditions.

Maybe your product is corrosive; maybe it isn't. But if you need a vacuum from atmosphere to 50 microns absolute, take a long look at Worthington's comprehensive line of steam jet ejectors which use regular plant steam. They're low in first cost, and their operating and maintenance expenses are practically non-existent — no moving parts. You can specify them in stainless, bronze, porcelain, impervious graphite, Worthite, cast iron or steel. Write Worthington Corporation, Steam Power Division, Ejector Section X.3.2, Harrison, New Jersey.

X.3.2

## WORTHINGTON



team Jet Ejectors • Ga

**Gas Compressors** 

**Chemical Pumps** 

Industrial Mixer

Refrigeration Equipment

When inquiring check CP 7367 opposite last page



## Get faster filtration at lower cost with this new Niagara

When your process calls for liquid-solids separation by filtration, you can do it more economically with the new Niagara Pressure Leaf Filter.

Doubt it? All right . . . just compare your present labor cost and production figures with the time-and-money-saving advantages you could have with a Niagara Horizontal Pressure Leaf Filter. For example:

- Flow rates are 2 to 5 times greater than with clothcovered presses.
- The stainless steel leaves require no cloths . . . a big saving in material and labor.
- · A Niagara can be drained, opened, cleaned, closed, filled and precoated . . . by one man . . . in a matter of minutes instead of hours.
- No cake disposal problem with a Niagara Horizontal Filter. Just tap or shake the leaves and dry cake

drops off into hopper for recovery or dry disposal.

- · Hydraulically-operated quick-opening cover is standard on Niagara Horizontal Filters, saving time and effort for the operator.
- · Every Niagara Filter is constructed in accordance with ASME requirements. Pressures up to 75 PSI are standard; can be built for pressures up to 1500 PSI.
- · Because of their simple fabricated design, Niagaras can be made of stainless steel and other corrosionresistant materials, with rubber or plastic linings, and jacketed or insulated at less cost than you'd think.

See what we mean? You can really save time and money with this modern equipment. And the same is true of Niagara Vertical Filters. That's the story you'll get from hundreds of users all over the country. For more details, just clip and mail the coupon. No obligation.

Niagara FILTERS

American Machine and Metals, Inc.

☐ Send catalog No. NC-1-53 ☐ Have representative call IDEAS

#### Processes make CI compounds

Series of processes for making chlorinated derivatives of sugar. starch, cellulose, cellulose esters, and cellulose ethers, has been developed by Sharples Chemicals Corporation, Philadelphia, Pennsylvania, and is being offered for licensing.

Proposed uses for the derivatives include plastics additives, sterilizing agents, chemical intermediates, oxidizing agents, paper treatment, and organic acid manufacture.

(Processes may be licensed through H. L. Barnebey, Dept. CP, 835 North Cassady, Columbus 19, Ohio . . . or for more information check CP 7368 on the convenient Reader Service slip located opposite last page.)

#### Chemical patents at a glance

Chemical patents issued by the U.S. Patent Office are available in easy-to-read abstract form. Diagrammed in standardized summary form, certain information is placed in particular areas of the diagram. Generic name for first reactant or starting material, second and third reactant, and final product are given, along with specific examples, concentrations, and amounts.

Published weekly in digest-size format, the editors expect that only a two-week period will elapse between issuance of patent and date of publication.

To obtain a year's subscription to Chemical Patgrams, remit \$100.00 direct to Chemical Patgrams, Dept. CP, PO Box 5559, Washington 16, D.C. When inquiring check CP 7369 on handy form opposite last page.

For more information on prod-uct at left, specify CP 7370 see information request blank opposite last page.

Privat plans

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#### Privately-financed plant plans to build nuclear power equipment

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Lynchburg, Va., is site for new facilities

Plant for manufacture of fuel elements and other reactors core components for the nuclear power industry is being constructed near Lynchburg, Virginia, will be all privately-financed. Main building will be a one-story structure of about 100,000 sq ft and will house laboratories and offices as well as the customary manufacturing facilities.

The 500-acre site borders the James River and was selected in accordance with regulations used by AEC in selection of government sites. Company expects to build complete nuclear steam generators for producing electric power.

(Plant described above is being built by Atomic Energy Division, Babcock and Wilcox, Department CP, 161 E. 42nd Street, New York, New York.)

### Waste treatment equipment

Advantages of industrial waste treatment are covered in fourpage bulletin. Discussion of basic types of equipment available for treatment is included along with photographs of typical installations.

Bul WC-117 is issued by Graver Water Conditioning Company, a division of Graver Tank and Manufacturing Company, Inc., Dept. CP, 216 West 14th Street, New York 11, New York. When inquiring reader may simply specify CP 7371 on the convenient Reader Service slip which is located opposite last page.

For more information on product at right, specify CP 7372
. . . see information request blank opposite last page.



## Get faster centrifuging at lower cost with this new Tolhurst

When your process calls for liquid-solids separation by centrifugal force, you can do it more economically with this new Tolhurst Center-Slung® Centrifugal. Here's why:

- Center-Slungs can safely handle 3 to 4 times greater out-of-balance loads. This means less time and less care required in loading the basket.
- Heavy-duty motor brings basket and load up to speed quickly, cutting extraction time to a minimum.
- New design of case bottom provides faster, more complete drainage.
- Does your process work better when slurry is heated or refrigerated. Center-Slungs can be jacketed for circulating steam or coolant, at minimum cost.

 Center-Slungs can be equipped with hydraulic drive which provides infinitely variable speed centrifuging. This means you can centrifuge many different slurries, each at optimum speed, all in the same machine.

Tolhurst Center-Slungs are available in 7 sizes, with either perforate or imperforate basket and capacities from one to 17 cubic feet per load. They can be built of steel, stainless steel, monel, steel rubber covered and many other corrosion-resistant materials. They're completely described in an illustrated catalog which is yours for the asking.

FREE CENTRIFUGING SLIDE RULE—There's no charge for this pocket-size slide rule which you can use for quickly calculating centrifugal force. Just mail the coupon.

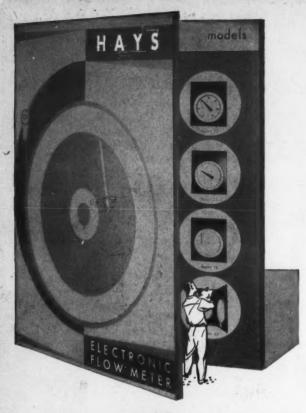
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American Machine and Metals, Inc.

DEPT. CP655, EAST MOLINE, ILLINOI

☐ Send catalog	☐ Have representative call
Name and title	
Company	
Address	

Specialists in Liquid-Solids Separation



# a guide to better flow metering

Here's a new fact-filled, technical booklet that tells you feature for feature how the new Hays electronic flow meter excels.

Electronic operation—provides maximum accuracy (14% of full scale differential), and speed (4 seconds for full scale pen travel).

Mercuryless transmitters—rupture-proof metallic oellows for differential pressure measurement.

Continuous integration—motor-driven, continuous mechanical integrator is extremely accurate even on rapid load changes.

Other features include powerful motor, easy readability, accuracy unaffected by normal temperature changes, optional explosion and weather-proof transmitter.

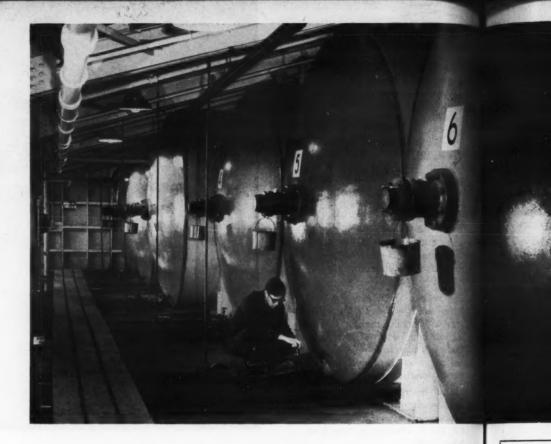
Write now for bulletin 54-1074-222 and get the important facts.

Automatic Combustion Control
Saller Panels \* COs Recorders
Verifiew Maters and Yactival
Open Analysars - Drett Geges
Combustion Test Sels
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MICHIGAN CITY 12, INDIANA

When inquiring check CP 7373 opposite last page



## check tank inventory at turn of a valve

Convenient system reads contents directly in pounds, supplants difficult and doubtful readings

SAM DREVITCH, Engineer Dewey & Almy Company with BRUCE FADER, Associate Editor

Problem: Reading contents of seven solvent sealing compound tanks at Dewey & Almy's Acton, Mass. plant was time-consuming and uncertain. Guesswork in inventory was bad; estimating how much material could be safely added to a tank was worse.

Here's what Dewey & Almy engineers faced: solvent sealing compound is a viscous material which must be paddle-agitated continuously. Fresh material had to be pumped into tanks periodically— and its viscosity had to be corrected by adding solvents to the mixture.

High viscosity ruled out bubble tubes. Agitator blades argued against any sort of probe to check tank level. Only practical way to find contents was to stop agitators, check level with a dip stick, calculate inventory from volume and specific gravity. This took about 15 minutes per tank . . . and four or five of the seven tanks usually required at least one reading every day.

Solution: Dewey & Almy customer, a can company, used solvent sealing compound and had the same problem on a smaller scale. They had discovered a tank gage which worked well and passed the word along to Dewey & Almy engineers. It looked so good that the plant borrowed a unit and tried it out immediately.

In principle, gage operates like a bubble tube—but with an important difference. No bubbles or fluids of any kind are passed into material being measured. Force balance operation of a diaphragm in a pressure transmitter keeps measuring element constantly in balance without fluctuation such as that caused by bubbles breaking free of a dip tube

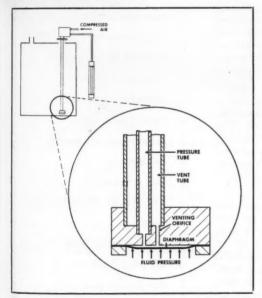
Schematic

in a viscour Compressed restriction cavity, in the Side of diagonal with tank of



Instrumentation and Control

Discharge end of solvent lining tanks



Schematic of gage for one tank showing close-up sketch of transmitter itself

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Compressed air is fed to transmitter through a restriction in the line. It enters a closely machined cavity, in the transmitter, fitted with a diaphragm. Side of diaphragm opposite air supply is in contact with tank contents at lowest tank level to be meas
(Continued on next page)

## **Cut Costs**

FLOWRITE

One of Powers Premium Quality

Diaphragm
Control Valves

They're simple

sturdy and dependable

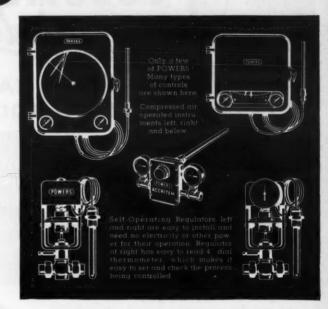
... increase profits with



Automatic

## TEMPERATURE

and Humidity Control



Improved Product Quality quickly pays back a big return on the investment in Powers Control

By eliminating the wastefulness of human errors with the dependable accuracy of Powers automatic control you eliminate losses caused by OVER-heating or Under-heating.

You will get better control if you use the right type temperature controller and proper size control valve for your requirements. An experienced Powers engineer will gladly help you.

Call Your New

Call Your Nearest Powers
Office or Write us direct

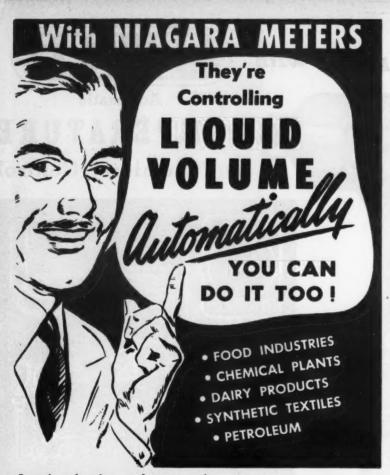
#### THE POWERS REGULATOR CO.

Skokie, Ill. • Offices in Chief Cities in U.S.A.
Canada and Mexico • See your phone book

VALVES: Available in a variety of body types and inner valves.

OVER 60 YEARS OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

When inquiring check CP 7374 opposite last page



Imagine the time and guesswork you can save by measuring liquid volumes automatically. Just set the hand of the NIAGARA Electri-Contact METER at the volume desired and turn on the flow of liquid.

#### SET IT - FORGET IT

It will turn off automatically. NIAG-ARA METERS enable your men to handle more work.

Practically every type of industry is using and acclaiming the accuracy of NIAGARA METERS. They precisely measure liquid volumes from one to one thousand gallons a minute!

There's a NIAGARA METER for nearly every type of liquid including most chemicals. Investigate the advantages of NIAGARA METERS.

Write today for full details.

72



## FALO METER CO.

2892 MAIN STREET . BUFFALO, NEW YORK

When inquiring check CP 7375 opposite last page

#### INSTRUMENTATION

(Continued from preceding page)

ured. On the air side is a vent port in the machined cavity. This is opened or closed by movement of the diaphragm. With fluid in the tank and no air entering the cavity, diaphragm would be forced against vent port, closing it. But when air is admitted slowly under pressure, diaphragm is distended into the tank contents when air pressure exceeds tank pressure. In practice, however, this diaphragm movement is very small. As diaphragm is lifted from the face of the port, vent is uncovered and air can escape from behind the diaphragm.

Result of this force-balance arrangement is that air pressure behind the diaphragm (hence in feed air line) is always maintained at same value as pressure (head) in the tank. In this case, air pressure is picked up by manometers calibrated directly in pounds contained in the tank. Signal could be passed on to pneumatic recorders or controllers, if desired.

Manometers are located at an operator's station overlooking tanks. Scales individually calibrated to fit the tanks allow direct reading of weight content for the two sizes of tank (5000 and 10,000 gal) used. Correction can be made for specific gravity without calculation. This is done by adjustment of scale position.

Besides obvious advantage of not introducing air to tank, system makes it impossible for compound to leak back into instrument lines. Transmitter will withstand over-pressures of 250 psi and requires only 4 cubic feet of air per hour to operate. Stainless diaphragm does not contaminate product.

Results: In order to find contents of any tank directly in pounds, operator now simply turns a valve which connects desired tank to manometer. Viscosity of compound couples impulses from agitator blades to the manometer so that reading pulsates. Practice has proved that averaging reading by eye is accurate enough — though extreme accuracy of reading can be had by shutting off agitator.

Operators like this system for two reasons: nuisance and danger in making readings are completely eliminated; since readings are easy to make, they can be made any time — keeping records and operating conditions exact. Actual time saving runs about 1½ hours per day — though it would have taken more time than that to make as many readings as are now made. Five to ten minutes per reading are also saved in laboratory in calculating the correct amount of solvent for adjustment of solids and viscosity.

Installation, in operation since July of 1954, has been so successful that a similar one is being planned for latex storage tanks.

(Tank Gaging installation was made by King Engineering Corp., Dept. CP, Ann Arbor, Mich. Check CP 7376 on handy form opp. last page.)



## alphabetical index on page 214

... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 214. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want ... in a hurry!

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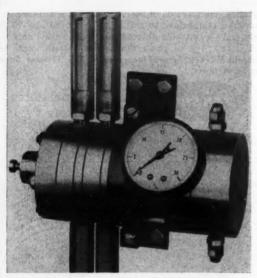
## Transmit from max of 35 psi to monitor filtration, low flows, etc...

force balance employed in low pressure transmitter with standard output range

Uses: Transmitter measures low pressure in industrial service — such as water filtration, sewage flows, other low rates of flow, loss of head, liquid level, and pressures to 35 psi.

Features: Force-balance principle produces rapid response which is linear with measured pressure.

Description: Compact transmitter (7" long x 3" diam) delivers standard pneumatic output pressures. These are exactly proportional to changes in load pressure. Output may be direct or inverse



Transmitter is only 3 inches in diameter

function of single loading pressure. Transmitter will also take difference or sum of more than one pressure. Small diameter tubing connects transmitter to remote instrument.

(Model ATD BalanCel Transmitter is a product of Builders-Providence, Inc., Dept. CP, Div. of B-I-F Industries, Inc., 345 Harris Ave., Providence, R. I. . . . check CP 7377 opposite last page.)

#### INSTRUMENTS SPEAK UP

... in the September issue of CHEMICAL PROCESSING. Look for a rundown of what's new and what's coming up in that month's feature.



#### WHY DRAW WHAT YOU CAN RECORD?

WE don't know that anyone has ever counted the hours scientists spend drawing curves, but in a busy laboratory it runs well into the thousands every year. The time that's spent plotting instrument readings can be used for more profitable work if you let Fisher RECORDALL draw the curves for you.

#### READ ... RECORD ... CONTROL

The RECORDALL is the first truly universal laboratory recorder. It will record any instrument reading that can be converted into the proper electrical signal. Built-in circuits and special adapters make it three instruments in one:

A DIRECT-READING INDICATOR with clip-on scales for every function and range . . .

A VARIABLE-SPEED RECORDER which uses standard strip charts . . .

A CONTROLLER which turns external circuits on and off when the recorded signal is above or below a pre-set control point.



You don't have to buy expensive recording models of your instruments, with limited ranges, when you can use the RECORDALL with your present equipment.

#### TO BE MORE SPECIFIC ...

The RECORDALL records the following variables directly or with convenient adapters:

DC CURRENT—in 11 ranges from 5.5 microamperes to 550 milliamperes, full scale.

DC POTENTIAL—11 ranges, 5.5 millivolts to 550 volts, full scale.

RESISTANCE—6 ranges, 11 ohms to 5500 ohms full scale.

TEMPERATURE from  $-100\,^{\circ}\text{C}$  to  $320\,^{\circ}\text{C}$  in two ranges with the Fisher Resistance Thermometer Bulb.

TEMPERATURE from 0 to 1000°C with a

Chromel-Alumel thermocouple.

PRESSURE—3 ranges: 0-100 psi, 0-500 psi, and a compound range for 0-30" of mercury (vacuum) and 0-50 psi (pressure).

VACUUM-1 to 1000 microns of mercury.

POLAROGRAPHIC CURRENT—with an adapter which makes the Fisher Electropode® an automatic recording instrument.

pH from 0 to 11 with Beckman H-2 pH Meter and the RECORDALL Zero Shifter.

Other adapter kits are being developed for the functions in greatest demand.



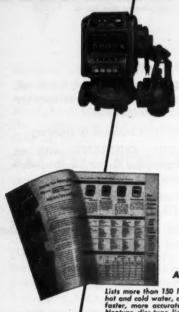
The Fisher RECORDALL gives you the advantages of a sensitive recorder on all of your busiest instruments. For full details of the RECORDALL and its accessories, write to 717 Forbes St., Pittsburgh 19, Pa., for booklet FS-251-19.

When inquiring check CP 7378 opposite last page

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WHAT YOU CAN DO Now WITH LIQUID METERS!



### 1. Improve **Quality Control**

WITH METER-PRINTED **BATCH TICKETS** 

This Neptune Print-O-Meter automatically stamps a ticket with the number of gallons or pounds of liquid delivered to your batch or process . . . a perfect, fool-proof record for closer control over quality, costs, and inventory. Coupled with Neptune Auto-Stop or Auto-Switch features, it offers you many new time and labor savings. The Print-O-Meter is available with accurate Neptune meters from 1 to 4 in. size, 5 gpm. to 500 gpm.

### 2. Control Pumps, Valves, etc. WITH AUTO-SWITCH METERS

An explosion-proof electrical switch on this meter is actuated automatically when the desired quantity of liquid has been delivered. Use it to turn pumps on or off, to actuate solenoid valves, start agitators, or control other cycling operations. Available with or without the mechanically coupled Auto-Stop valve, which also is actuated by the tripping mechanism in the register. Auto-Switch available with Neptune meters from 1 to 4 in. size, 5 gpm. to 500 gpm.

Ask for Helpful Metering Bulletin 567AP

Lists more than 150 liquids . . . chemicals, syrups, hot and cold water, oils, etc. . . . you can measure faster, more accurately, more automatically with Neptune disc-type liquid meters.

NEPTUNE METER COMPANY 19 West 50th Street, New York 20, N. Y.

ATLANTA . BOSTON . CHICAGO . DALLAS . DENVER NO. KANSAS CITY, MO. . LOS ANGELES . LOUISVILLE PORTLAND, ORE. . SAN FRANCISCO

In Canada: NEPTUNE METERS LTD., TORONTO 14, ONTARIO



When inquiring check CP 7379 opposite last page

#### INSTRUMENTATION

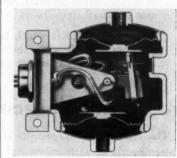
Pressure difference actuates switch or alarm . . .

> can be set for any differential from 0 to 99 psi

Uses: Can be used as a controller or alarm based on measurement of pressure difference between two points.

Features: Switch can be adjusted to throw in at any differential between 0 and 99 psi. Working range is 0.5 to 100 psi.

Description: Accurately sensing difference in pressure between two points, switch will actuate electric circuit on increase or decrease of any predetermined pres-



Pressure taps on switch are shown top and bottom. Differential adjustment is knurled wheel near

sure difference within its range. Switch is easily adjusted in the field. Tamperproof cover protects setting against accidental disturbance.

Switch will operate in any position. Installation is simple - no balancing or leveling is necessary. Functions of switching or pressure sensing elements are not affected by vibrations when mounted near pumps or compres-

Splash-proof housing protects mechanism from dust or damage in exposed locations.

(Model 462 Meletron is a product of Barksdale Valves, Dept. CP, 5125 Alcoa Ave., Los Angeles 58, Calif. . . . or for more information check CP 7380 on handy form opposite last page.)

## Now...

a new Temperature Indicator-Controller by Fenwal



Fenwal's new Series 540 is a remote Temperature Indicator-Controller that combines low cost with high accuracy over a range of 100° to 700°F. Designed for a wide variety of processing equipment, the new controller operates on a liquid-filled bulb and capillary system, with a bellows transmitting reponses to the indicating pointer. Setting pointer and bulb temperature pointer indicate against the same scale face, permitting "glance" comparison of both readings at a distance. Accuracy is maintained to within 3% over the 100°-700°F range. An adjustable differential can be varied between 0.8% and 4% of scale range. For details, write for Bulletin MC-122. Fenwal Incorporated, 246 Pleasant Street,



Controls Temperatures ... Precisely

When inquiring check CP 7381 opposite last page



 Write for latest catalog covering the complete line of B/W Induction Relays, Relay Enclosures, Contactors and Starters, Multiple Pump Controls, Electrode Holders, Starter and Relay Combinations, Special Controls and Panels.

Controls will never trouble you, when you buy B/W

#### B/W CONTROLLER CORPORATION

2204 East Maple Road, Birmingham, Michigan

When inquiring check CP 7382 opposite last page

CHEMICAL PROCESSING

Shirt-p rates

I lses: electrical Features: ohms per

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(Model 3: Electric ( Chicago 4 CP 7383 (

JUNE, 19:

## Shirt-pocket meter rates 10,000 ohms/volt

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volt-ohmmeter measures 0-1200v AC and DC on 12 ranges, 0-10 megohms on four ranges

Uses: Testing and checking instruments and electrical equipment.

Features: Instrument has sensitivity of 10,000 ohms per volt on both AC and DC ranges. It is small enough to carry in shirt-pocket.



Shows actual size of meter with ohm zero-adjust on right side

Description: Measuring 2¾ x 4½ x 1", voltohmmeter is small, compact, and weighs seven ounces. Meter movement is shielded against interference from magnetic metals or strong magnetic fields. Leads are partially threaded to maintain contact and have an insulation rating of 5000v. Accuracy of instrument is 3% (DC) and 5% (AC) of full-scale voltages.

(Model 355 volt-ohmmeter is product of Simpson Electric Co., Dept. CP, 5200 W. Kinzie St., Chicago 44, Ill. . . . or for more information check CP 7383 on handy form opposite last page.)

NEW BULLETIN

Provides economical solutions to every industrial water treatment problem

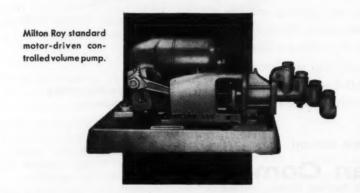
Engineers and consultants helped prepare this new Bulletin No. 953... "Controlled Volume Pumps for Water Treating Systems."

It has been termed, "a most important contribution to water treating literature."

Over fifty illustrations are used in this first-of-its-kind Bulletin, to describe and picture:

- Controlled Volume Pumps and how they work.
- Actual applications in all phases of industrial water treating.
- Basic and advanced system design.
   Send for your free copy today . . . on your company letterhead, please!

For specific recommendations on water treatment problems, see your consulting specialist. For reliable, accurate flow control of water treating chemicals, see Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.





Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America, and Africa.

When inquiring check CP 7384 opposite last page



## Wheelco Panelmount Capacitrol

Makes centralized temperature control more dependable and economical





Compactness, serviceability, and instantaneous response make Wheelco's Panelmount Capacitrol one of industry's "top" temperature controllers for the automation age! This central panel, for example, utilizes 24 "Panelmounts" for completely automatic, accurate control of diversified heating operations. There is complete interchangeability of "plug-in" components. Tuning adjustments, relays, and other parts are designed for fast, easy servicing and low maintenance. But, even more important, Wheelco's "no contact" principle eliminates time lag between sensing signal and control response, assuring accurate and dependable control. Write for Bulletin F-5345-1, which describes five different control systems and economies made possible by Wheelco "Panelmounts."

WHEELCO INSTRUMENTS DIVISION

## Barber-Colman Company Dept. R, 1520 Rock Street, Rockford, Illinois

Barber-Colman of Canada, Ltd., Dept. R, Toronto, Ontario, Canada Industrial Instruments - Automatic Controls - Air Distribution Products - Aircraft Controls - Small Motors Overdoors and Operators . Molded Products . Metal Cutting Tools . Machine Tools . Textile Machinery

When inquiring check CP 7385 opposite last page

#### INSTRUMENTATION

#### Thermocouples produce pneumatic output with relay . . .

converter can also be used on other low output devices

Converter produces 3-15 psig pneumatic signal proportional to input signal of 2 to 50 millivolts.

Features: Transducing unit makes it possible to take small electrical inputs from thermocouples or similar devices and transmit signal in standard pneumatic range.

Description: Converter is composed of two main sections upper section is an amplifier-converter, lower section contains transducer. Null balance is used so that no current is drawn from thermocouple. Magnetic force is balanced against force produced by output air pressure.

Pneumatic output of 3 to 15 psig is linear with millivolt input. No batteries, slide wires, or motors are used. Specifications call for wide temperature ranges (-50°C to 3000°F), span from 2 to 50 millivolts, span accuracy 1%, reproducibility 1/4% of span, ultimate sensitivity better than 0.01% of span.

Unit can be furnished in explosion-proof housing. Overall dimensions are 7 x 171/8 x 41/8".

(Type T3C thermocouple-air converter is a development of The Swartwout Co., Dept. CP, 18511 Euclid Ave., Cleveland 12, Ohio . . . or check CP 7386 on handy form opposite last page.)

#### Shows positive-acting level indicators

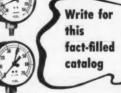
Four-page bulletin in two colors describes level indicators suitable for solids, liquids, solids-inliquids. Wiring diagrams for installation are suggested.

"Bin-Vue" is issued by Convair, Dept. CP, 714 Brookline Road, Pittsburgh, Pa. Specify CP 7387 on handy form opp. last page.

## MARSH



If it's a pressure gauge or dial thermometer, Marsh makes it ... and makes it better. The types, ranges and case styles are endless. What is "special" to other instrument makers is often standard to Marsh. To know the scope of Marsh instruments-





MARSH INSTRUMENT CO. Sales Affiliate of las. P. Warsh Corneration Dept. Z, Skokie, III. . Marsh Instrument & Valve Co. (Canada ) Ltd., 8407 183rd Street, Edmonton Alberta . Export Dopt., 3501 Howard Street, Skokle, Ill.

When inquiring check CP 7388 opposite last page

## BULLETIN

How you can save time by measuring air velocities with an ALNOR VELOMETER



Developed to facilitate quick and easy determination of air velocities, the Alnor Velometer is a compact, precision instrument that provides instantaneous, direct readings in feet per minute, without timing, calculations or reference to conversion tables. Guaranteed accurate, in ranges from 20 f.p.m. to as high as 24,000 f.p.m. Also available with metric or milesper-hour calibrations.

Tear out this ad and mail it with your business letterhead to Illinois Testing Laborate ries, Inc., Room 504, 420 N. LaSalle St., Chicago 10, III.



#### PRECISION INSTRUMENTS FOR EVERY INDUSTRY

When inquiring check CP 7389 opposite last page

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Descri tors a contin 18 pa system illustr **ND46** 

> North Philad **CP 73**

## Very wide rangeability, . good characteristics embodied in valve

Uses: For controlling small flows in proportion to pneumatic signal. Wide-open flow of gas is 700 cfh, of water 700 cc/min (just under 0.2 gpm).

Features: Special linkage, operating at right angles to diaphragm movement, results in nearly elliptical flow characteristics at low flow rates — relatively large changes in instrument air pressure result in small changes in the rate of flow.

Description: Conventional open orifice and conical plug are used in control valve. Only one seat is needed to achieve a full rangeability from C<sub>v</sub> of 0.000001 to a C<sub>v</sub> of 0.18. Key to this extreme rangeability is a right angle linkage whereby diaphragm displacement "straightens" a triply-pivoted sliding linkage to valve stem. It is this linkage that provides very slight throttling for large air pressure changes in the low range, yet gives rapid change with air pressure at the high range. Unique linkage system also gives a full-open to full-closed operating time of 1/10 second.

Pneumatic positioner is standard equipment. Reversing relay is built into this to assist return spring on the operator piston and speed up operation. Valve can be used with any pneumatic indicating or recording controller with full operating pressure up to 30 psi. Wide open flows stated above, however, are obtained with nominal control pressure of 15 psi.

Valve is built with stainless body, heat treated stainless steel stem, hardened stainless replaceable seat. Packings are fluoroplastic. Frame supporting piston and actuating linkage is high-tensile cast aluminum which is also used for piston and its cylinder.

(Meter-Mo Pneumatic Proportioning Valve is a product of American Instrument Co., Inc., Dept. CP, 8010 Georgia Ave., Silver Spring, Md. . . . or for more information check CP 7390 on handy form opposite back page.)

### Five data sheets on recorders, indicators and controllers

Describing how temperature recorders, indicators and controllers can be used in batch and continuous processes, five data sheets totalling 18 pages include tables of complete control systems. Design features of each control are illustrated.

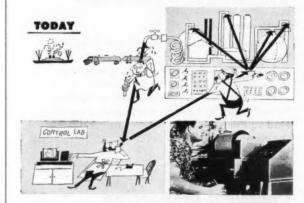
ND46-33(100) to (104) are issued by Leeds & Northrup, Dept. CP, 4934 Stenton Avenue, Philadelphia 44, Pa. When inquiring specify CP 7391 on handy form opposite last page.

# Analysis Moves from Lab to Line

The pride of the automation proponents is the chemical processing plant. Carloads of materials flow through its complex network of pipes into gleaming fractionation columns, purification towers and reactors with a minimum of human attention. Equally large amounts of finished product flow outward without ever having been seen by human eyes.

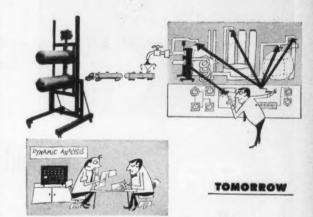
This complex system functions smoothly thanks to the hundreds of control instruments in any processing plant. They control material flow, they provide the correct temperature and pressure to produce the highest product yield. These plants represent our closest approach to the automatic factory.

But in this system there are flaws. For even when all dials and gages are functioning correctly, the product yield in terms of quality and quantity may be completely awry. These instruments will not indicate changes in raw material composition, catalyst contamination, or loss of efficiency in a scrubbing tower. Present-day instruments indicate only the process stream environment, not the composition of the process itself. Only the control labora-



tory is able to give us an accurate picture of the product and its composition as it moves through the plant. Subtle deviations in the product can be spotted and analyzed, and from the control laboratory instructions can be forwarded to process areas prescribing changes in control instrument settings. Thus, true control in today's processing begins in the analytical laboratory.

But efficient as they are, control laboratories still represent a bottleneck in the processing chain. It takes time to move a sample to the laboratory, analyze it, and relay findings back to the plant. Meanwhile, vast quantities of



product may have moved through the processing units.

An obvious solution is to move the laboratory to the problem, i.e., tie an analytical instrument like the infrared spectrometer directly into the process stream where it can produce continuous and instantaneous data. Instruments capable of providing such "on-stream analytical control" are just beginning to appear. They will not replace existing environmental controllers but they do provide the means for automatically controlling these instruments to meet changing process stream conditions. They close the loop between the product and the process stream environment in which it is produced.

Two such on-stream analyzers are already in production by Perkin-Elmer and are being used in the field. Known as the Bichromator and Tri-Non Analyzers, each has its use depending upon the particular problem to be solved. While the most obvious application for such analyzers is to monitor the finished product, in a complicated chemical process where there are many variables, end point analysis does not provide sufficient control information. Hence, it is found advisable to install instruments at several critical points in the process. Such analyzers will soon make true automation a reality in chemical processing.

Digest of an article from Control Engineering, Oct., 1954.
Reprints available from Perkin-Elmer on request.

THE PERKIN-ELMER CORPORATION, NORWALK, CONN.

First in Analytical Control

When inquiring check CP 7392 opposite last page

page

SING



## Have you wondered

why this magazine

comes to you

## ...without charge?

MAYBE, LIKE MANY others, you've always thought that all publishers make their money, or much of it, from the subscriptions they sell.

#### 'Tisn't so . . .

... no, 'tisn't so. With the exception of a few general magazines (e.g. READER'S DIGEST) that sell hundreds of thousands — some millions of copies — most industrial publishers with relatively small circulations actually lose money on their subscription sales.

Then how do industrial publishers make money? As you can guess, they make it from the advertising they sell. Total subscription sales are hardly a "drop in the bucket" compared to advertising revenue.

#### Advertisers demand best coverage

Since advertisers pay the bills, they demand best possible coverage of all important men in the field. So it's up to the publisher to publish the most readable magazine possible... then to insure coverage of the maximum number of the best readers.

You can't do that by selling subscriptions—sales costs are high—a large share of the subscribers cancel each year—and no matter how much time, money, and pressure is used

there are always some of the important men who will never buy.

As you can see, the most effective method of getting the kind of coverage advertisers want is (a) to hand-pick the most important men; (b) send the magazine to ALL these men; and (c) to make the magazine so interesting, so valuable that they will want to read it.

#### That's why . . .

... Chemical Processing is sent only to qualified readers . . . selected management and technical key-men in the chemical industry; that's why you get Chemical Processing free—that's why we spend thousands of dollars on each issue to make it worth your time to read it. For you are an important reader in the chemical processing field.

## **Chemical Processing**

Published by Putman Publishing Company

Creators of PUTMAN-STYLE Megazines
... terse, vital editorial; "hand-picked" circulation;
square, high-visibility format; quality readership;
hence more READER ACTION





#### INSTRUMENTATION

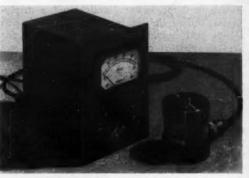
DC operates strain gages reliably
— cuts pickup, phasing errors,
uses no vacuum tubes . . .

remote pressure indicator uses DC strain gages to transmit readings as far as 500 feet

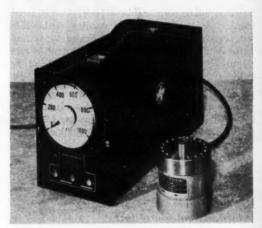
Uses: Indicates presure data transmitted from hazardous or remote locations up to 500 ft away from instrument.

Features: Indicator furnishes regulated DC for instrument system, including strain gage bridge in transmitter, eliminating phasing errors and reducing pickup voltages.

Description: Indicator does not use vacuum tubes and has no moving parts other than those of meter. Accuracy of transmitter-indicator system



Three inch scale reads 0 to 50 psig



Seven inch scale reads 0 to 1000 psi

is within 2% of full scale. Regulated power supply is built-in. Connector is provided on indicator for four-wire shielded cable which can be as long as 500 ft. Indicators are made in two models, one with three-inch meter scale, another with seven-inch circular scale.

Both models operate on 105/130v AC. Size of three-inch-scale model is 6 x 8 x 8". Seven-inch-

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scale model is 6 x 7 x 12". Both models are designed to operate with manufacturer's transmitters. (Teledyne remote pressure indicators are product of Taber Instrument Corporation, Dept. CP, Section 46, 111 Goundry St., North Tonawanda, N.Y. . . . or check CP 7393 opposite last page.)

## Drill blind orifice-plates to job requirements

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Uses: Experimental and plant measurements of gaseous or liquid stream flow rates.

Features: Can be drilled to meet field conditions.

Description: Blank orifice plate is micrometermachined and ground for minimum turbulence. Plate disc is pressed into standard ring gasket and



Blind plate is center-marked for drilling ease

drilled when used. Fitting standard pipe flanges, orifice plate is quickly installed and removed.

(Mac-Iron orifice plates are product of The Mack Iron Works Company, Dept. CP, 137 Warren St., Sandusky, Ohio. Check CP 7394 opp. last page.)



#### Need instrumentation for that process?

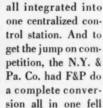
You'll find just what you need in the alphabetized, itemized Product Directory on pages 214 to 217. All subjects and products presented in ads and editorial columns are there.

## The New York & Pennsylvania Company found that...



Like other leading companies, the New York & Pennsylvania Company, makers of fine book and specialty papers, found that Fischer & Porter offered them integrated instrumentation and control systems — all from a single source.

Converting their Johnsonburg, Pa., mill from batch-type stock preparation to continuous automatic stock preparation called for five separate blending systems feeding five separate paper machines, plus a complete refiner control system —



swoop!

From one source, the N.Y. & Pa. Company obtained the engineering experience and know-how to design and instrument the system, the specialized meters (e.g., Ratosleeve\* stock meters) and valves (e.g., Ratogate\* stock valves) and instruments (all of F&P design and manufacture) to control the processes, and the complete panel fabrication right down to the last graphic symbol.

Because the complete package was obtained from one team, responsibility for delivery and performance was not divided, the cost far less. Perfectly matched instruments, rather than nonmating components, meant complete satisfaction for this customer.

Write today and tell F&P your needs – the answers will be yours quickly, without obligation. Compare and you must agree – F&P is the one source that stands out.



Write for details on the F&P Ratographic\* miniature pneumatic recorder-controller, offering 4-inch strip chart record.

\*T.M., F&P Co.



complete process instrumentation FISCHER & PORTER CO.

2165 County Line Road, Hatboro, Pa.

LA 1028

MEASURING, RECORDING AND CONTROLLING INSTRUMENTS • CONTROL PANELS • DATA REDUCTION SYSTEMS
CONTRACT INSTRUMENTATION RESEARCH • CHLORINATION EQUIPMENT • INDUSTRIAL GLASS PRODUCTS

When inquiring check CP 7395 opposite last page

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## Every Plant Needs 'Em

for OUICK-EASY CONTROL AND POSITIVE SHUT-OFF of AIR · GASES · LIQUIDS · SOLIDS



The full flow area, easy control and shut-off features of these W. S. Rockwell Slide Valves (Blast Gates) make them dependable units for pipe lines and processing equipment. They are made in any required metals, in 1" to 24" pipe size, with manual or automatic operators, to meet any required operating conditions.

Relatively low in first cost, easy to install, rugged, efficient, compact. Write for Catalog.



2205 ELIOT STREET . FAIRFIELD, CONN.

Sales Representatives in Principal Cities

When inquiring check CP 7396 opposite last page

The names of these new Emil Greiner flowmeters tell the whole story. We believe they are the most important development in flowmeters since the invention of the rotameter. Now you can obtain complete predictability for all fluids! Heretofore you had to do individual calibrations for each specific fluid. With the Predictability Flowmeter, you can calculate the calibration curve directly, without the need of the experimental calibration that was necessary in the past. The EMIL GREINER Co. The Emil Greiner Co., Dept. 224 20-26 N. Moore Street, New York 13, N. Y. Please send me Flowmeter Bulletin. ZONE\_\_\_STATE\_

When inquiring check CP 7397 opposite last page

INSTRUMENTATION

Check 23 thermocouples with one pyrometer and indicator . . .

> multi-point indicating system for kilns, furnaces, bearings

Uses: Taking temperature readings of scattered kilns, furnaces, dies, bearings from one central point.

High-resistance py-Features: rometer in wall or panel mounted switch box gives negligible differences in readings with leads of varying lengths.



This model indicates temperatures at five locations

Description: Pyrometer, selector switch, terminal strip are enclosed in single cabinet. Standard scale ranges are from 0 to 3000°F. Movement sensitivity is 10,000 ohms/v. Different models have from 3 to 23 switch positions. Individual calibrating spools of lead wire can be housed in cabinet where lead-ins are widely varying lengths. Meter scale has anti-parallax mirror, is 5" long.

Thermocouple switches are available where existing instrument is to be used. Switches have terminal panel for thermocouple and instrument connections.

(Multi-point indicating pyrometers are product of West Instrument Corp., Dept. CP, 525 N. Noble St., Chicago 22, Ill. Check CP 7398 on form opposite last page.)

now-MEASURE, CONTROL LIQUID DENSITY continuously and automatically with the PRINCO **Densitro** 

Process industries will welcome the new DENSITROL-the precision instrument that gives a continuous reading of density in flowing liquids such as sugar syrups, brine, acids. DENSITROL electrical indicators or recorders can be located remote from the sampling chamber itself. If desired, DENSITROL can be linked with control mechanisms for automatic regulation. For information on temperature and pressure ranges, calibrations, and other specifics, request Bulletin W-3.

#### PRECISION

THERMOMETER & INSTRUMENT CO.

1434 Brandywine Street, Philadelphia 30, Pa.

Makers of precision-built thermometers, barometers, hydrometers, gauges, indicators, mercury in glass thermo-regulators.

When inquiring check CP 7399 opposite last page





No. 160 Dwyer Pitot Tube shown checking air velocity with No. 1010-1 Magnehetic Gage. Dwyer also makes a full range of inclined and vertical manometers, port-

NOW GRADUATED IN INCHES ON BOTH SIDES Simplify centering in duct, accurate traversing

Complete range of sizes: 12" to 60" lengths. (Popular set: No. 161-18", No. 163-36".) "P" styles available with integral ½" or ¾" pipe thread mounting gland . . . also available with split flange mountings . . . either at slight extra cost.

● stainless steel throughout ● test-confirmed unity coefficient • direct reading charts supplied • meet NAFM, ASH&VE specs • for temperatures to 800° F. • clean, burr-free static holes • priced as low as \$12.50

Write for Dwyer Bulletin No. B-2

F. W. DWYER MFG. CO. MICHIGAN CITY, INDIANA

When inquiring check CP 7400 opposite last page

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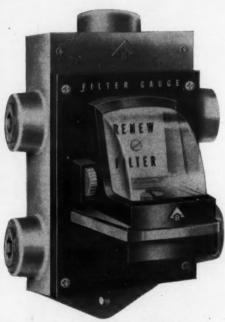
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pressure differential across air filter actuates signal vane displaying words "Renew Filter"

Provides continuous monitoring of dustremoval efficiency of air filters in industrial ventilating and air conditioning systems.

Signal vane displaying words "Renew Filter" flips into view when pressure differential across filter becomes excessive due to dirt.

Description: Gage is adjustable between 0.06 and 3.5 inches water differential pressure. Signal remains visible, once actuated, until gage is reset after filter is cleaned or replaced. Built-in electric



"Renew Filter" appears on bright orange background when air filters are dirty

switch will operate signal light or alarm located any distance from gage. Calibration adjustment also allows presetting gage to actuate when differential pressure is twice that of clean filter.

(Air filter gage is product of Bacharach Industrial Instrument Company, Dept. CP, 7301 Penn Ave., Pittsburgh 8, Pa. Check CP 7401 opp. last page.)

> Surface Tension for common oils is shown in nomograph, page 194



## It's in the Bag!

## Fresh, Clean Ink for a Year of Trouble-free Recording

★ You won't have any messy, time-consuming re-inking of pens on the new Bailey Recorders. The entire system is white-glove clean hermetically sealed, non-evaporating, non-corrosive. Gone is any chance of sludge or oxide formation. Gone are clogged pens, interrupted records, unsightly splashes.

The transparent plastic ink sacs are changed once a year-that's all. Capillary tubing carries fresh, clean ink to the pens continuously without any day-to-day attention.

This exclusive new inking system\* is only one of the many timesaving, money-saving distinctive features of the new Bailey Recorder.

Ask for Product Specification E12-5.

\*Now available for the New Bailey Recorder only.

#### ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER

- · Pre-calibrated plug-in receiver units
- · Up to four pneumatic or electronic receivers or two receivers and two integrators
- Any four variables on one chart—easily read and interpreted
- A full year's ink supply at one loading
- Faster ordering—from stock
- · Minimum inventory of parts
- Minimum instrument investment for process cycle expansion or alteration



Controls for Power and Process

When inquiring check CP 7402 opposite last page

## Booklet on technical charts contains samples

Illustrated 12-page catalog outlines company's services in producing recording charts for standard and special instruments. It includes samples of both dial and roll-type charts. Technical information is given on requirements for special charts.

Booklet on charts is available from Technical Charts Inc., Dept. CP, 189 Van Rensselaer St., Buffalo 10, N. Y. When inquiring specify CP 7403 on handy form opposite last page.

## High and low temps cause alarm to act . . .

single actuating Bourdon tube trips high, low switch

Uses: Can be used in a variety of alarm, interlock, and control circuits where two temperatures are important.

Features: Single Bourdon tube actuates mercury switches at high and low set points.

Description: Two-stage temperature control uses a single Bourdon tube to actuate two mercury switches. These can be adjusted for temperatures in eleven operating ranges. Adjustment is made on visible calibrated dial.

Typical operating setup requires one alarm circuit to close at high temperature and another at low temperature. Both circuits remain open between high and low temperature points.

Another typical setup would open electrical interlock in one circuit when temperature became higher than set point. Second circuit would open if temperature dropped below set operating points. Device could also provide two-stage control by opening one circuit on a rise of temperature and a second on another rise of temperature.

Sealed magnetic mercury switches



## d/p Cell Flow Transmitter...

NEW POSITIVE OVERRANGE PROTECTION . . . up to full 1500 lbs. cell rating

## 6 Major Achievements!

NEW FULLY ADJUSTABLE RANGE . . . from 0-50" to 0-250" H\_O differential

NEW AUTOMATIC INTERNAL DAMPING . . . fast, stable measurement

NEW SIMPLICITY . . . lowest cost installation

Pioneered by Foxboro 7 years ago, the d/p Cell\* Transmitter established a new standard of performance in flow measurement and control. Over 40,000 are maintaining that standard in every branch of industry today. Technical advances, based on this unequalled experience, now have added even further reliability, economy and convenience. Call your Foxboro representative for a demonstration, Write for new Bulletin 13-11.

\*Reg. U. S. Pat. Off.



est in flow measurement

M FOXDORO COMPANY, 816 NEPONSET AVE., FOXBORO, MASS., U.S.A.

are enclosed in steel case conforming to NEMA weather-proof and explosion-proof specifications as required.

(Two-stage temperature control is a development of The Mercoid Corp., Dept. CP, 4201 W. Belmont Ave., Chicago 41, Ill. . . . or for more information check CP 7404 on handy form opposite last page.)

### Records process data over wire . . .

system for long-distance data transmission

Uses: For transmission of flow, pressure, liquid level data.

Features: Transmits over long distances with accuracy of  $\pm 2\%$ .

Description: Electrical transmission system utilizes two-wire circuit, (private or leased wire.)



Records data from distant source

Data pick-up may be many miles distant. Instrument can also be adapted for explosion-proof installations. Measurement ratio of variable can be 4 to 1, 10 to 1, 13 to 1, 18.5 to 1 and 20 to 1. (Orthoflow is product of Simplex Valve & Meter Company, Dept. CP, 7 East Orange St., Lancaster, Pa. . . . or for more information check CP 7405 opp. last page.)



For more information on product at left, specify CP 7406 . . . see information request blank opposite last page. Accurately regulates flow of liquids containing suspended solids or trade wastes-with no effect on moving parts!

A Simplex venturi tube, the most accurate form of primary device, does double duty-measures as it controls.

Special throat section is flexible rubber. If flow tends to change, motor-

driven clamping device adjusts throat area - quickly returns flow to control

Throat section is self-scouring. Viscous fluids contact no moving parts.

Write for full details today! Simplex Valve & Meter Company, Dept. CP-6 7 E. Orange St., Lancaster, Pa.

IT'S SIMPLEX IT'S ACCURATE

When inquiring check CP 7407 opposite last page

## For THERMOMETERS that are DURABLE, ACCURATE, ADJUSTABLE



#### **Rochester Dial Thermometers**



Hermetically sealed against moisture and dirt to bring you years of trouble free service.



Recalibrate the dial externally by inserting the stem in liquid of known temperature and adjusting screw attachment.



Designed to be used indoors or out, the stainless steel case is impervious to most corrosive agents.



Rochester Straight-Form Thermometers bring you the added advantage of a stem that can be mounted in any position around the dial.

For additional information contact your Rochester sales engineer or write;



Manufacturing Company, Inc.





When inquiring check CP 7408 opposite last page

#### INSTRUMENTATION

Thermo-sensitive but resistant to attack . . .

thermostats handle 5000 watts

For temperature control of corrosive liquids and gases.

Resistant to chemical attack but sensitive to temperature changes.

Description: Quartz tube contains liquid which actuates contact mechanism by expansion and



Dial controls quartz thermostat

contraction. Rating is 5000 watts at 120-240v.

(Thermex quartz thermostats are product of N.J. Thermex Company, Inc., Dept. CP, 533 Bergen St., Harrison, N.J. Check CP 7409 opposite last page.)



This electrode can be used to control liquid levels at pressures up to 4000 psi, temperatures up to 800°C. Metal parts are non-magnetic stainless; vitrified aluminum oxide replaces conventional mica. Sizes from 3/8 to 5/8" diam thread.

(WCC 12 Level sensing electrodes are made by Auburn Spark Plug Co., Dept. CP, 41 York St., Auburn, N.Y. Check CP 7410.

## TRICKY FLOW PROBLEMS

#### solved by simple Transmitter!

THE New Taylor TRANSAIRE\* Differential Pressure Transmitter is designed to meet present day requirements for a rugged, dependable and accurate pneumatic instrument an measure flow, liquid level, or specific gravity. Compact design, force-balance action, dry (mercuryless) type. Ten-toone adjustability in each of two ranges: 20-200" water; 80-800" water. Inexpensive, simple to install. Economical and easy to maintain.

Ask your Taylor Field Engineer for full details of this new transmitter, or write for Bulletin 98097. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

\*Reg. U.S. Pat. Of.

## Taylor Instruments MEAN ACCURACY FIRST

When inquiring check CP 7411 opposite last page



## **Temperature Indication**

You Benefit from Eye-Level Readings



Auto-Lite offers many therometer styles, permitting plant-wide temperature obsernus 60°F to plus 750°F. Send for latest catalog showing vari

THE ELECTRIC AUTO-LITE COMPANY

TEMPERATURE INDICATORS & RECORDERS

When inquiring check CP 7412 opposite last page

CHEMICAL PROCESSING

your piping end costly wa in your p Williams-H. Valves. Av standard pip 1" to 20", installed wit tools. Send 654 which co plete details.

146 Stanwix St., 2 Pittsburgh 22, Pa.



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Yes . . . you can quiet your piping system and end costly water hammer in your plant with Williams-Hager Check Valves. Available in standard pipe sizes from I" to 20", they can be installed without special tools. Send for Bulletin 654 which contains complete details.



654 of Bulletin 65 Check Valves. Center WILLIAMS GAUGE Gateway c1 St., 22.

WILLIAMS GAUGE CO., INC. 2 Gateway Center . Pittsburgh 22, Pa.

opposite last page JUNE, 1955

When inquiring check CP 7413

"Master-minds" batching, conveyor movement . . .

> counts and controls unit movement, batching according to pre-set limits

Controlling feed of two conveyors into one, batch mixing, other processes with numerical control factors.

Features: Instrument electronically counts up to 20 times per second with accuracy of one count in 2500 and shows count.

Description: Photo-electric cells, thermocouples, mechanical switches are used as counting devices. Controller receives count and summarizes, starting or stopping operation according to preset limits.



Inditron tubes show count of 1955

Unit count can be fed from either one or two sources. Instrument will count up to 50 units, packages or batches, for example, on two lines or processes. Controller is 7 x 10 x 8".

Indicator tubes are called "Inditrons," have ten indicating elements shaped in the form of numerals from zero to nine.

(Electronic digital controller is product of American Electronic Mfg., Inc., Dept. CP, 9503 W. Jefferson Blvd., Culver City, Calif. . . . or check CP 7414 on handy form opposite last page.)

Illustrates "modern design" for gage indicators

Functionally-styled draft gages are pictured in two-color four-page bulletin. Units shown use vertical scale for draft and low pressure. Gages also could be used for indicating levels, flow, temperatures, and pressures transmitted pneumatically by other instruments.

Pub No. 54-1060-210 is issued by the Hays Corporation, Dept. CP, 742 E. Eighth St., Michigan City 34, Indiana. Specify CP 7415 opposite last page.



## HILLS-McCANNA Type metering PUMPS

give TROUBLE-FREE PERFORMANCE ON **TROUBLESOME FLUIDS** 

Built to serve dependably in an industry that is on the move, the Hills-McCanna "U" Pump is daily finding new services to add to a diverse group of hundreds of different types of metering and proportioning jobs. But assurance of trouble-free performance through a wide range of problem fluids is only one of several versatile features offered by the "U" Pump.

One, two, three and four feed assemblies, mounted on a common base, are available in a range of capacities from 0.10 to 24.0 gph per feed. Operating pressures are from 125 psi to 5000 psi. Variable speed drive or a choice of 30, 40, 50 and 70 strokes per minute (with stroke length adjustment from 0 to maximum) provide efficient controlled pumping . . . reliability and accuracy that has made the "U" Pump the preferred pump for research, pilot plant and production uses.

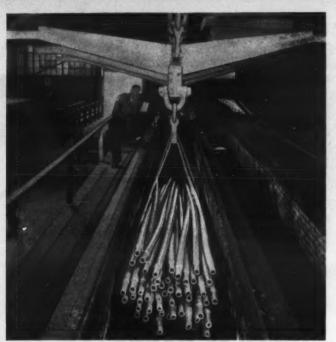
Write for Bulletin UP-54, outlining "U" Pump service ... recommendations for over 325 applications. And ask about other Hills-McCanna metering and proportioning pumps. HILLS-McCANNA CO., 2370 W. Nelson St., Chicago 18, Ill.

metering and proportioning pumps

Also Manufacturers of:
SAUNDERS TYPE DIAPHRAGM VALVES FORCE FEED LUBRICATORS . MAGNESIUM ALLOY SAND CASTINGS

When inquiring check CP 7416 opposite last page

85



Installed by National Acid-Proofing Inc., Tinley Park, Illinois

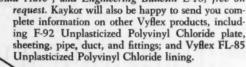
## New Answer to Process Problem ... VYFLEX L-10 STOPS TANK CORROSION

Globe Steel Tube Company of Milwaukee, Wisconsin tried everything. But 20% nitric acid-hydrofluoric acid solutions at temperatures of 80 to 90°F ruined every lining applied to their 47-foot pickling tank. Finally, Globe engineers hit on Vyflex L-10, and haven't spent a penny on lining maintenance or replacement since.

Globe Steel Tube learned, as so many other firms have, that the first cost of Vyflex L-10 is the last cost for lining materials. That's because this new lining material, based on Polyvinyl Chloride resins, excels in all three important categories of lining performance:

- L-10 resists acids, alkalis, salts, plating solutions, and organic compounds at temperatures up to 160°F... even protects against oxidizing acids like chromic, nitric, and phosphoric, and highly concentrated strong alkalis.
- L-10 is strong and elastic . . . withstands the toughest kinds of abrasion and mechanical abuse.
- L-10 presents no application problems. Qualified Kaykor applicators across the country give fast, professional service applying L-10 to steel, wood, concrete, in the field or in the shop.

GET THE FACTS! Write today for the complete story on Vyflex L-10 in "Facts You Should Have", and Engineering Bulletin L-10, free on



TRADE MARK REG. U.S. PAT. OFF.

### KAYKOR INDUSTRIES, Inc.

Division of Kaye-Tex Manufacturing Corp.

4401 BROAD STREET • YARDVILLE, NEW JERSEY

When inquiring check CP 7417 opposite last page

#### corrosion control

Plastic fume duct at Humble Oil Company is still as good as new after —

## ten years service handling sulfuric acid vapors

If all corrosion problems could be solved as satisfactorily as this one, plants would have far fewer headaches

H. M. STEWART, Engineering Associate Humble Oil Company, Baytown, Texas With Associate Editor GORDON WEYERMULLER P lastic fume duct system in use at Humble Oil Company hasn't been touched by the sulfuric acid vapors it has handled for the past ten years. According to the supervisor in charge of the area where the duct is in service, if all equipment in chemical applications could be made to stand up like this, it certainly would relieve the plant of a great many problems.

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Fume duct was installed in the Lube Treating and Acid Restoration Area. Here sulfuric acid is recovered from lube treating sludges and refortified. Fume duct is connected to lead-lined, covered kettles of 600 to 1000 bbl capacity used for acid



separation. Corrosive vapors are drawn through ducts by a blower and pass up stack. Previous to the installation of the duct system, noxious fumes made working conditions in this area undesirable.

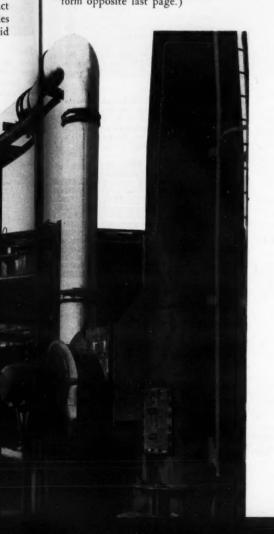
Vapors being handled contain 2-3% SO<sub>2</sub>, about 1% or less complex hydrocarbons, and 5% water vapor. Gases, which average 150-180°F, are exhausted at a rate of 1500 cfm.

Duct work was made from a plastic containing phenol-formaldehyde resin and an acid-digested asbestos fiber. This material has strength, toughness, and durability, combined with excellent corrosion resistance.

As far as can be ascertained, the duct in use at Humble is the same thickness as it was the day it was installed. No maintenance has been necessary due to corrosion. Installation of the duct greatly improved working conditions in the area.

to

(For further information on plastic construction material used for duct check CP 7418 on handy form opposite last page.)



CONTROL
CORROSION
where only
MINIMUM
SURFACE
PREPARATION
is possible

Amercoal
33
SYSTEM
System

There is no substitute for ideal surface preparation. But every maintenance engineer is confronted with corrosion problems in locations where only minimum surface preparation is possible. The Americant 33/86 System is amazingly helpful in many of these cases. Here is how it works:

**FIRST:** apply Amercoat 86 Primer, brushing it well into the surface. This unique primer has a high tolerance for surface contamination and will adhere to many problem surfaces.

- It is both inhibitive and chemically resistant.
- It stifles underfilm corrosion and under-cutting.
- It forms a truly compatible base for vinyl topcoats, eliminating peeling and lamination.

Follow the line of MOST resistance

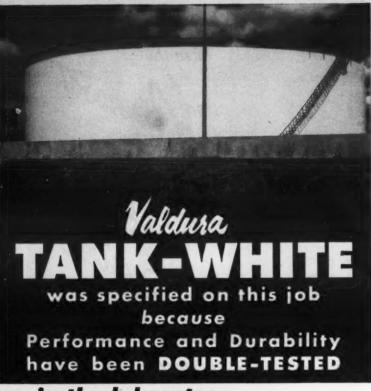
If you have a difficult corrosion problem in your plant, perhaps we can help you. Our fifteen years of specialized experience is at your service. Write for literature and the name of the trained Amercoat representative in your city.

THEN: apply Amercoat 33, the time-tested vinyl coating. Because of its high solids content, you get a thicker, heavier coating—"more mils per gallon". Applied by hot spray\* or conventional spray, it takes fewer coats of Amercoat 33 to build the required film thickness.

In addition, you get more economical protection per square foot per year because Amercoat 33 is formulated specifically for maximum chemical resistance and for severe weathering conditions.

\*You have the confidence of knowing that more Americal 33 has been applied by hot spray than any other vinyl maintenance coating ! No need to stock two types of material.





in the laboratory... and on countless jobs

Valdura Tank-White

... and every other product in Valdura's complete line of heavy-duty industrial maintenance paints . . . is the product of thorough research in ultra-modern laboratories staffed by hundreds of the finest technicians in the industry.

Your added dividend, when you buy a Valdura product, is that it's

#### JOB TESTED!

Valdura's years of experience as the its products.

leader in the field of heavy-duty industrial maintenance paints, provides case record after case record to prove the efficiency and economy of

If you'd like to know more about Valdura's complete line of specialized maintenance products, or if you'd like help with a particular problem, just state your wishes on your regular letterhead and mail to the address below. Your inquiry will be treated as an invitation to provide service . . . not as a license to exert selling pressure!



Non-yellowing and

self-cleaning

#### VALDURA HEAVY PAINT DIVISION AMERICAN-MARIETTA CO.

101 E. Ontario St., Chicago 11, III.

When inquiring check CP 7420 opposite last page

#### CORROSION CONTROL

Thirty-minute installation possible with external mechanical seal that's corresion-proof . . .

> has complete interchangeability with stuffing box packing in pumps and agitators

On equipment handling acids, caustics, solvents, and other chemical liquids and slurries under a wide range of operating conditions.

Seal can be installed in only 30 min. Features: It is designed for complete interchangeability with stuffing-box packing in pumps, agitators, autoclaves, and other rotating processing equipment.

Description: External mechanical seal assures perfect sealing, with possibility of spray leakage eliminated since sealing faces are located inside stuffing-box. Seal is simply designed.

(Chempro "wedge-lock" external mechanical seals are products of Chemical and Power Products, Inc., Dept. CP, 11 Broadway, New York 4, N.Y. . . . or check CP 7421 opposite last page.)

Products carry one-year guarantee against corrosion . . .

> applies to glassed-steel equipment specified for certain corrosives

A one-year guarantee against corrosion is being given with company's glassed-steel products. Guarantee applies to all steel equipment that is purchased expressly for processing certain specified corrosives, and in the specified range of processing conditions. Such equipment includes reactors, stills, receivers, condensers, heat exchangers, and storage

Under the guarantee, if chemical attack should render a glassed-steel product inoperable within first year of use under specified conditions, company will either repair or replace it free of charge on an F.O.B. factory basis.

(Guaranteed glassed-steel products are manufactured by the Pfaudler Company, Dept. CP, 1000 West Ave., Rochester, N.Y. . . . or for more information check CP 7422 opposite last page.)

#### Data on rubber-protected pumps

Capacities, dimensions, and photographs of centrifugal and rotary gear pumps, made corrosionresistant by rubber protection, are detailed in 16-page technical bulletin CE-55 issued by American Hard Rubber Co., Dept. CP, 11 Mercer St., New York 13, N.Y. When inquiring specify CP 7423 on handy form, opposite last page.

The VALDURA name stands for a complete line of specialized industrial maintenance products designed to serve every type of American industry. Typical products are indicated below. Other Valdura Specifics and Exclusives will be identified in future ads. Watch for them! They can solve your toughest maintenance problems.



Just one coat of Gilsomastic provides a tough, durable film as thick as eight to ten coats of ordinary paint! It's nature's perfect protec-tion against the elements and in-dustrial fumes because it's made with Gilsonite . . . 991/2% pure natural asphalt.

If you figure maintenance costs in cost per square per year, VAAP is your best buy in an aluminum paint. It's fortified with asphalt ... it provides better "leafing." It's made for heavy duty performance.



If you have a particular maintenance problem which is urgent just de-scribe it on your regular letterhead and mail to the address below. Your inquiry will be treated as an invitation to provide service . . . not as a license to exert selling pressure!



ALDURA HEAVY DUTY PAINT DIVISION AMERICAN-MARIETTA CO.

When inquiring check CP 7424

opposite last page

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Dow

Tanks of laminated glass fiber used in Bulova Watch Co's. plating department . . .

corrosion-resistant material is 1/5 weight of steel, but as strong

Four plating tanks of laminated glass fiber have recently been installed in the plating department of Bulova Watch Company, Bulova Park, Long Island. Material (called Iolyte) used for tanks is as strong as steel, pound for pound, although only one-fifth its weight, and resistant to all plating chemicals used. It can be fabricated to any specifications, in any size or shape. No molds are needed.



Outsides of plating tanks at Bulova are clad in stainless

Used for watch dial plating, each tank serves a different function ... numeral plating, preparation for silver plating, color plating, and acid line. Approximately 10 x 3 x 3', each tank has up to 12 compartments for dip and spray rinses. Compartments are designed to provide a continuous flow of fresh water for dip rinses.

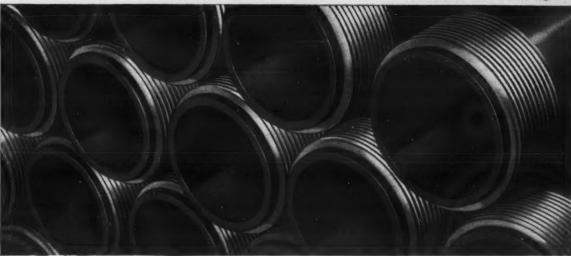
Tanks have from one to three inlets and drains, facilitating plumbing problem. Provision is made for agitators and steam coils. Outsides of tanks are clad in stainless.

(Fiberglass plating tanks are products of Schori Process Division, Ferro-Co Corp., Dept. CP, 8-11 43rd Road, Long Island City 1, N.Y. Check CP 7425 opposite last page.)

#### Non-oily corrosion inhibitor

A non-oily corrosion inhibitor which deposits a durable monomolecular layer as a moisture barrier on treated surfaces is described on single-page data sheet.

Sheet No. 104 is issued by John B. Moore Corp., Dept. CP, PO Box 3, Nutley 10, N.J. Specify CP 7426 opposite last page.



## You Can See Why SARAN LINED PIPE

## is your answer to downtime losses

It's made of corrosion-resistant saran pipe swaged right inside rigid steel pipe . . . two pipes in one for longest-lasting performance.

Here's really trouble-free piping . . . saran lined pipe, fittings and valves! This modern piping has a durable inner lining that eliminates shutdowns due to corrosion . . . forms tight-fitting joints that prevent leakage. Saran lined pipe, fittings and valves won't burst under working pressures up to 150 psi . . . and saran lined cast steel fittings are available for even higher pressures. Every single piece of saran lined pipe, fittings and valves is carefully spark-tested by hand to be sure there are no pinpoint holidays or cracks in the lining.

Installation costs are low with saran lined pipe, fittings and valves, too. They can be cut and threaded in the field with modified pipe-fitter's tools. And because they're rigid, few supporting members are needed.

If your operation requires the conveying of acids, alkalies, solvents and other corrosive liquids, be sure to investigate saran lined pipe, fittings and valves today. For further information, write the Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale 20, Michigan, Dept. SP529B.

RELATED SARAN PRODUCTS—Saran rubber tank lining • Saran rubber molding stock • Saran tubing and fittings • Saran pipe and fittings.

SOME OF THE MANY INSTALLATIONS USING

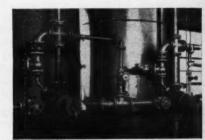
### SARAN LINED

STEEL PIPE

Saran Lined Pipe is Manufactured by The Dose Chemical Company Midland, Michigan



Hydrochloric acid has been conveyed in this installation for well over seven years. Service has been eminently satisfactory.



Saran lined pipe is used here in an automatic water de-ionizer. This installation has also had a long record of uninterrupted service.

you can depend on DOW PLASTICS - DOW



When inquiring check CP 7427 opposite last page

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TA CO.

424

for ACE Rubber Linings and Coverings

Most any size or shape of special processing equipment can be lined or covered with quality Ace hard or soft rubber . . . for meticulous protection against corrosion, to resist abrasive wear, or to provide electrical insulation. Ask for recommendations.



STOP VALVE CORROSION

at lower cost

There's an Ace hard rubber, rubber-lined, or plastic-lined valve for every corrosion application. Sizes from 2" to 24". Diaphragm, gate and check types.

Free Bulletin CE-52 lists chemicals that can be handled.

chemical equipment in ore resistant to more corrosives.

Complete line of rubber and eight basic materials for pipe tanks, molded parts, utensils, etc.



#### FOR HIGH PRESSURES OR BIG PIPE LINES

ACE Rubber-Lined Steel . . . strength and pressures of steel plus chemical resistance of hard rubber. Excellent for alkalis, most inorganic acids, many organic acids, all salts, bleaches. Sizes 1¼" to 24" and up. Bulletin CE-52.

ACE SARAN PIPE

An old stand-by with many new uses . . . Odorless, tasteless, general-purpose rigid pipe and semi-flexible tubing. Highly resistant to most chemicals. Threaded pipe ½" to 4", tubing ½" to ¾". Ask for Bulletin 351.

## ACE rubber and plastic products

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET . NEW YORK 13, N. Y.

When inquiring check CP 7428 opposite last page

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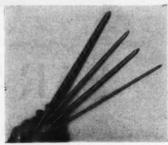
#### CORROSION

Impact, corrosion, wear resisted by Cr-Co-W hard-facing alloy . . .

available as rod for oxy-acet torch application

Uses: General hard-facing applications where wear and corrosion resistance are required.

Features: Hard-facing alloy provides high impact, corrosion, and abrasion resistance. It resists oxidation, does not readily heat-check under pressure at elevated temperatures, and is virtually unaffected by common corrosives.



Alloy is available in 3/16 to %"

Description: Chrome-cobalt-tungsten hard-facing alloy, called Walloy No. 6, is available as hard-facing rod for oxy-acetylene torch application. As deposited by torch, alloy has a Rockwell hardness of 40-44 on the C scale. Tensile strength is 105,000 lb/sq in, specific gravity is 8.3, and melting point is 2325°F.

(Hard-facing alloy is a product of Wall Colmonoy Corporation, Dept. CP, 19345 John R Street, Detroit 3, Mich. . . . or check CP 7429 opposite last page.)

## Describes silicone paint for 1600°F service

Corrosion-resistant silicone paint for 1600°F service is described in six-page brochure.

Brochure on Sili-Kool is issued by C. H. Dragert Co., Inc., Dept. CP, PO Box 5092-L, Dallas, Tex. Specify CP 7430 opposite last page.

#### UCILON PROTECTIVE COATINGS



acids, alkalies, salt solutions, water and other active chemicals, here may be your answer.

A variety of Ucilon\* Protective Coating Systems, using either airdrying or baking coatings, are available to solve corrosion problems.

drying or baking coatings, are available to solve corrosion problems. Applied like ordinary paint, Ucilon Coating Systems resist many of the severest service conditions. The line includes vinyl, phenolic, chlorinated rubber, Neoprene and other chemical resisting coatings. Send for Bulletin MC-9.

\*Trademark

## **UCILON** Protective Coatings

UNITED CHROMIUM, INCORPORATED

A Metal & Thermit Organization

100 East 42ad St., How York 17, H. Y. • Defroit 20, Mich. • Waterbury 20, Cam.
Chicago 4, IR. • Lee Angelec 13, Cal. • In Canada: United Chromium Limited, Toronto 1, Oct.

When inquiring check CP 7431 opposite last page



## Marman Designed for the food and chemical processing industries...

field tested on creamery tank truck hoses for more than a year. Wide strap grips hose tight without cutting. Quickcoupler and wing nut will not vibrate loose. Specify where requirements include ruggedness and dependability under constant cleaning and reuse.

Order 17340 Hose Clamp, state hose O.D. to 1/16"

<u>17340</u> — <u>2.50</u>

Series No.

Dia. expressed in hundredths inches (100=1 inch)

Write, wire or phone Dept. CP-655

THERE IS A MARMAN CLAMP OR COUPLING AT EVERY GOOD JOINT MARMAN PRODUCTS CO. Inc. 11/214 EXPOSITION PLAS LOS ANGELES 64 CALIF

When inquiring check CP 7432 opposite last page

CHEMICAL PROCESSING

HOT rectan signed depen under condi

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With stee bronze-toless steel orifice sea service on

FULL S FULL STEEL

With so socket w 3000-lb. a service.

showing line o CATAW

620 Mill When in



HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE! FOR ALL PRESSURES! FOR ALL TEMPERATURES!



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Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000lb. sizes 1/8" to 3"; 6000-lb. sizes 1/8"



ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000lb. service.

#### MALE & FEMALE UNIONS

With steel-to-steel. bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



**FULL STAINLESS & FULL ALLOY** STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb.



WRITE FOR CATALOG 11 showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE AND FITTINGS COMPANY

620 MIII St. · CATAWISSA, PA.

When inquiring check CP 7433 opposite last page

JUNE, 1955

page

SSING

**Highly-corrosive plating solutions** handled by filter pump using Hastelloy C, PVC . . .

> two series are available having capacities of 50 and 100 gph

Filtering high-concentration chloride, chromic acid, fluoboric acid, or acid sulfate electroplating solutions.

Filter pumps, VHI series, rated at Features: 50 and 100 gph, are equipped with Hastelloy C pumps, fittings, and rigid unplasticized PVC filter assemblies.

LHI series pumps, rated at 50 and 100 gph, are identical to VHI series, except that filter assem-

blies are fabricated of high-temperature Lucite. LHI series can handle all plating solutions mentioned above except chromic acid.

Description:

Pump, filter assembly, and motor are mounted on a corrosion-resistant, linenimpregnated, phenolic panel with ball bearing, rubber tire casters for easy mobility. Each unit

comes equipped with 10' lengths of inlet and outlet hose. A plastic strainer is furnished with the inlet hose. Motors are totally-enclosed, ball bearing, 110v, 60 cy, single phase.

Pump, filter assembly, and

motor are mounted on

phenolic panel which has

casters for easy mobility

(Filter pumps are product of Sethco Mfg. Co., Dept. CP, 70-78 Willoughby St., Brooklyn 1, N.Y. . . . or for more information check CP 7434 on handy form opposite last page.)

#### Gives properties, other information on corrosion-resistant zirconium

Zirconium metal has extraordinary corrosion resistance. Increased production (with reduced costs) is making the metal more attractive for commercial applications. Manual of 36-pages gives properties of this metal in text, tables, and graphs. Potential ore supply, manufacture, uses, metal fabrication, and a detailed bibliography are included.

"Properties and Prices of Zirconium Metal" is issued by Zirconium Metals Corp. of America, a Subsidiary of National Lead Co., Dept. CP, 111 Broadway, New York 6, N.Y. Specify CP 7435 on handy form opposite last page.



## WILL HANDLE THEM ALL!

Wedge and sealing rings molded from DuPont Teflon assure efficient, safe handling of all known industrial chemicals and corrosives at temperatures varying from -120°F. to +500°F. Spring and metal parts are furnished in the metallurgical specification best suited to the particular service. In every way, you get a mechanical seal that is "John Crane" engineered to your requirements-no matter how tough!

The Type 9 Seal has and continues to solve innumerable problems where difficult-to-handle liquids and gases are involved . . . at pressures up to 750 psi. It can do the same for you.

Use the Type 9 Seal on all rotating shaft equipment—centrifugal and rotary pumps, mixers, agitators, autoclaves, other equipment.

REMEMBER: Your toughest problem can be the Type 9's next success story. Send for full details today.

Crane Packing Co., 1821 Cuyler Avenue, Chicago 13, Illinois. In Canada: Crane Packing Co., Ltd., 617 Parkdale Ave., N., Hamilton, Ont.



When inquiring check CP 7436 opposite last page



These test panels of rusty steel were coated at the same film thickness and exposed side by side in a highly corrosive atmosphere (35% hydrochloric acid vapors) for the same length of time. Coatings on both panels were identical, with one exception: primer on left panel was new Rustbond #6, that on right was a popular competitive primer. In both cases, the topcoat was the same well known competitive brand.

As this unretouched photo shows, the sharp edge protection of the panel at right has completely failed, while the panel primed with Rustbond #6 shows practically no edge failure.

You can get improved performance like this from any topcoat-vinyl, phenolic, alkyd-with Rustbond #6 as the primer.

Rustbond #6 offers you these advantages:

- Dries in only 10 minutes at 85°F., 15 minutes at 70°F., reducing application time and cost.
- Can be applied over wirebrushed rusty steel or bright shiny steel.
- All-purpose primer, especially resistant to acids and alkalies.
- Excellent shop coat because of easy application and high resistance to weathering.
- Can be brushed, sprayed, hot sprayed or rollercoated without webbing.

#### TRY IT YOURSELF

We will furnish a free sample of Rustbond Primer #6 for your own similar testing. Advise atmosphere, type of surface and topcoat involved. Write today.



A Division of Mullins Non-Ferrous Castings Corporation

Specialists
Corrosion Resisting
Synthetic Materials

333 Thornton Ave., St. Louis 19, Mo.

When inquiring check CP 7437 opposite last page

#### CORROSION

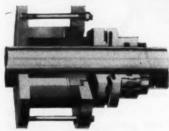
## Satisfactorily seals scored shafts . . .

excellent corrosion-resistance also offered by unit

Uses: As an external rotating mechanical seal for pump or agitator shafts which are subjected to difficult chemical service.

Features: Seal makes use of a balanced-bellows design, the bellows being made of chemically impervious Teflon. No scoring of shafts is possible and shafts already scored can be sealed.

Description: Seal rotates with the shaft. Only bearing surface is between precision-ground rotating and stationary faces. Extremely low friction load on shaft insures lower starting torque and power cost.



Bellows on seal is made of Teflon

Seal is manufactured in standard sizes from 7/8 to 21/8".

(Chemiseal mechanical seal is a product of United States Gasket Company, Dept. CP, 602 N. 10th St., Camden 1, N. J. Check CP 7438 opposite last page.)

## Includes field test data on acid-handling valve

Incorporated in eight-page illustrated bulletin are recent field test data on use of corrosion-resistant valves with various concentrations of sulfuric acid at different temperatures.

Bul No. 8 is available on letterhead request direct to Alloy Steel Products Co., Inc., Dept. CP, West Elizabeth Ave., Linden, N. J.

#### How to

#### S-T-R-E-T-C-H

Coil Life in H2SO4



. . . and other strong corrosives

## ... Switch to Curpenter Stainless No. 20 Ch

 Service life was DOUBLED... maintenance costs reduced to almost zero by making 7-foot coils for dyestuff process out of this super corrosion-resistant stainless.

Carpenter Stainless No. 20 Cb offers extraordinary resistance to  $\rm H_2SO_4$  in various concentrations, and free sulphate ions, at temperatures up to boiling. It is completely resistant to a long list of other strong corrodents such as arsenic, benzoic, carbonic, citric, picric, and mixed acids; acid-zinc solutions, and acetate solvents.

Send for FREE TEST SAMPLES to compare No. 20 Cb with other materials in your conditions. Ask for bulletin containing corrosion resistance, properties, performance results, applications, and fabricating data. For quick information on tubing, pipe, sheet and plate of Stainless No. 20 Cb, write, phone or wire...

## THE CARPENTER STEEL COMPANY Alloy Tube Division, Union, New Jersey

When inquiring check CP 7439 opposite last page

A Complete Line of

### **Corrosion-Resisting Fittings!**

INCO-CAST in Monel®, Nickel and Inconel®



#### All these features

- Resist most corrosives
- Withstand high and sub-zero temperatures
- Strong . . . tough . . . sound
- Protect product
- Controlled alloy composition
- composition
   Pressure—tested
- Economical in cost
- Threaded and welding types
   Fast service on

rated orders to all points from conveniently located distributors'

#### -WRITE NOW-

for handy price list catalog. It contains full information. Sent promptly on request, without cost or obligation to you.

#### tough Caps

Unions
Caps
Pipe Plugs
90° Street Elbows
Lock Nuts
Bushings
"Y" Laterals
Haif Couplings
Close Nipples
Flanges
45° Flanged Elbows
90° Flanged Elbows
Flanged Tees
Short Nipples
Reducing Couplings
Reducing Tees
Welding Nipples
Reducing Elbows
Welding Nipples
Return Bends

Couplings 45° Elbows 90° Elbows

Tees Crosses

PLUS
Special shapes and sizes made to order

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street, New York 5, N. Y.



When inquiring check CP 7440 opposite last page

CHEMICAL PROCESSING

features flexible

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## Easy application, excellent adhesion features of self-curing flexible coating

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Maintenance coating, now commercially available, is flexible, self-curing, readily applied in heavy coats, and has excellent adhesion to many surfaces. This material, based on du Pont's Hypalon chlorosulfonated polyethylene, also shows superior resistance to weathering, high temperature, and highly corrosive fumes and liquids including nitric acid, chlorine dioxide, hydrogen peroxide and chromic acid, as well as inorganic acids, alkalis, and salts.

(Hypalon Maintenance Coating is a product of The Atlas Mineral Products Co., Dept. CP, Mertztown, Pa. Check CP 7441 opposite last page.)



#### Is corrosion licking you?

Then be sure to see July CP . . .

The feature section carried in December on Corrosion Control aroused such enthusiasm in our readers that we are planning to feature this subject again in July. In fact, we plan to highlight our regular monthly Corrosion Control section annually in view of the tremendous interest in this field.

How other plants have licked their corrosion problems will be told in performance stories. Latest developments in materials and equipment will be presented . . . plus a host of other topics. Remember July CHEMICAL PROCESSING for answers to corrosion problems!

Editorial balance will be maintained, with other sections of CP appearing as always.

#### ECONOMY

High-alloy layer—usually 10% or 20% of total plate thickness—assures corrosion and abrasion resistance, long equipment

#### DESIGN FREEDOM

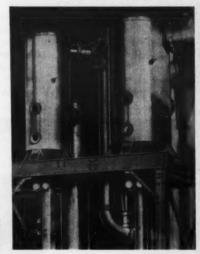
Integral bond allows design and fabrication of shapes to meet process and space needs.

### STRUCTURAL

Low-cost carbon steel backing provides necessary strength and rigidity.



Nickel-clad steel in this double effect evaporator guards against product contamination.



#### **CLAD STEEL EQUIPMENT PERMITS**

## **FULL DESIGN FREEDOM**

For pressure, vacuum or cyclical service, economical clad steels give you maximum freedom of design in tanks and pressure vessels. Clad steels are readily worked by conventional fabricating tools and methods, can be formed to shapes that best suit space and process needs. Because of the integral bond between high-alloy cladding and the carbon steel backing plate, full gage consideration is permissible under the ASME Code. You're assured of extralong service life, too, since openings can be cut and attachments welded to clad steel without harming this bond or allowing seepage.

By using clad steels, you get all the advantages of solid, high-alloy construction—protection from corrosion, abrasion and product contamination—with savings up to 50%

in material costs. These and other benefits, like fast heatup, easier cleaning and low maintenance, can be obtained from 16 cladding materials—various types of stainless, nickel, Inconel, Monel, copper.

These are supplied with a standard sodium hydride finish, or may be polished to help improve performance characteristics. When you're thinking of new tanks and vessels, qualified equipment builders can help your engineers and consultants take advantage of versatile Lukens' Clad Steels. We work closely with fabricators to help select the type most suited to your processing needs. To get more information, ask one of your equipment builders, or write Manager, Marketing Service, Lukens Steel Company, 750 Lukens Building, Coatesville, Pennsylvania.



## LUKENS CLAD STEELS

STAINLESS-CLAD · NICKEL-CLAD · INCONEL-CLAD · MONEL-CLAD

PRODUCER OF THE WIDEST RANGE OF TYPES AND SIZES OF CLAD STEEL PLATES AND HEADS AVAILABLE

When inquiring check CP 7442 opposite last page

## Resin cement protects concrete from hydrochloric acid

brick, resin cement, and plastic coating combine to resist spillage

Uses: Protection of trenches, tank bases, and other concrete surfaces against corrosive effects of perchlorethylene and hydrochloric acid spillage.

Features: A combination of three materials is used to obtain corrosion-proof surfaces: shale acid-proof brick, a resin cement, and a plastic-base thermosetting coating. In application, the entire surface to be protected is coated with  $\frac{1}{8}$ " of plastic coating, then shale brick is set in resin cement, providing an impervious monolithic surface.



After 15 minutes submersion in perchlorethylene plastic-base thermosetting coating at left shows no ill effects, while bituminous membrane has dissolved

Description: Synthetic resinous bonding cement for brick and tile has excellent qualities of workability, chemical and thermal resistance. In addition, it hardens to an extremely dense material which provides high mechanical strength.

The plastic-base thermosetting coating hardens into a stonelike material that is chemically equal to acid-proof brick in many applications. It can be trowel-applied more quickly than brick.

(Corobond resin cement, Ceilcrete B plastic-base coating, and shale brick are products of the Ceilcote Company, Inc., Dept. CP, 4834 Ridge Road, Cleveland, O. Check CP 7443 opposite last page.)



## RONZE VALVE NEWS IN 50 YEARS!



This revolutionary bronze globe valve has set completely new performance standards in the most severe service in industry!

LO600 gives you so much more service per dollar that you can't afford to continue using bronze globe valves that require constant repair and replacement!

Valve users, cooperating in a four-year testing program, were unable to find any service tough enough to wear out an LQ600 - or cause it to leak, even in the most severe throttling installations! This new valve is an investment - one that pays cash dividends in maintenance savings year after year!

BRINALLOY\* SEATS AND DISCS make these remarkable performance records possible. This exclusive new Lunkenheimer alloy is far more

resistant to wear and corrosion than 500 Brinell Stainless Steel - even outwears case hardened Stainless Steel exceeding 1000 Brinell! There is no need for renewability. No LQ600 Valve in four years service has required maintenance.

OTHER FEATURES - a streamlined new exterior . . . the famous Stemalloy® Stem, which far outlasts any other stem material ... the cool, easy-to-grip Non-Slip® patented

handwheel . . . durable, high-strength bronze in body and bonnet . . . and true back-seating, permitting safe and easy repacking under pressure,





For more information, call your local Lunkenbeimer Distributor or write The Lunkenheimer Company, Box 360, Cincinnati 14, Obio.

2 wks. to 2 mos.

"Short"

"Short" 6 mos.

wks. to 3 mos. "Short"

6 to 12 mos.

"Short"

4 to 5 mos.

#### TYPE OF SERVICE LIFE OF OTHER VALVES

125 lb. hose steaming

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Water col. blowdown 185 lb. steam blowdown 125 lb. steam blowdown

200 lb. steam-water col. blowdown Threttling syrup 140°F. 150 lb. threttling 380°F

100 lb. throttling

130 lb. throttling

110 lb. throttling steam Scaled hot water line

125 lb. throttling steam

150 lb. steam-scale

150 lb. throttling steam

#### **USER COMMENT**

Toughest service, previous valves leaked.

2 wks. to everal mos. 6 mos.

wirsdrawing.
Previous valves cut.
Plug valves failed
regularly.
Plug valves couldn's
hold up.
Composition seat valves
unsatisfactory.
Three other kinds failed.
About all makes used—
none held up.
Plug valves failed by
wiredrawing.
Previous valves broke.

Other makes falled by wiredrawing.

## 

1-455-4

**BRONZE • IRON** 

STEEL . PVC

When inquiring check CP 7444 opposite last page

Asbestos and titanium combine in coating for metal giving long-lasting protection . . .

> protects against creep corrosion, and is "selfhealing" if damaged

Protection of exterior or interior metal surfaces where abrasion is not involved.

Coating shows very good resistance to moisture, fumes, and creep corrosion. Resistance to acids and alkalis is also good.

Properly applied, coating provides a film as much as 15 times the thickness of a normal paint film. It forms a hard, tough outer coating over a pliant and flexible under surface. Coating "gives" with expansion and contraction without breakage of film. It is self-healing: if outer surface is broken the soft under film will heal and harden on contact with air. If film is abraded to bare surface, any rusting that results from this is limited only to the exposed area.

Description: Coating for metal is based on a wood oil vehicle with titanium or aluminum pigments and long asbestos fiber. Aluminum, white, and cement colors are standard shades available.

For application, surface must be clean and dry. Priming is not necessary since coating adheres best when applied directly to bare metal. Although it may be brushed or troweled, best results are procured by spray application using special spray equipment made for handling heavy coatings. No thinning of coating is necessary. After application outer surface will set up in 1 to 2 hours and become fairly firm overnight. Under surface remains pliable indefinitely.

(Protective coating, Dum Dum for Metal, is a product of The Arco Company, Sub. American-Marietta Co., Dept. CP, 7301 Bessemer Avenue, Cleveland 21, Ohio. . . . or for more information about manufacturer's product, reader may simply check CP 7445 on the convenient Reader Service slip which is located opposite last page.)

#### **Technical information** on wrought iron pipe

Fifty-two pages of technical information on wrought iron pipe and tubular products are in this two-color catalog. Over 25 tables list size, dimensional data for standard, extra strong, and double extra strong pipe that's welded or threaded. Other tables cover casing and tubing. Physical characteristics, specs, standards, and identifying markings are included in the spiral-bound book.

"Wrought Iron Pipe Catalog" is available on letterhead request to Engineering Service Dept., A. M. Byers Co., Clark Bldg., Pittsburgh, Pa.

## good reasons for buying COOPER ALLOY stainless steel FITTINGS





SCREWED. All pipe threads on COOPER ALLOY stainless steel fittings are checked to American Standard Tapered pipe thread gauges, and the use of special tools and equipment assures full threads, accurately gauged and perfectly aligned in all planes.



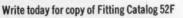
FLANGED. General dimensions of COOPER ALLOY stainless steel flanged fittings conform to standards set by the American Standards Association for steel flanged fittings... or to Manufacturer's Standardization Society specifications for corrosion resistant flanged fittings.



welding fittings are manufactured in accordance with ASA standards where applicable. They are made of forged or rolled stainless steel; all fittings are of uniform wall thickness and the ends, where wall thickness are greater than .083", are accurately machine tool cut and beveled.



**QUIKUPL.** These patented stainless steel fittings are designed for quick assembly without threading, welding or flaring. They cut installation or disassembly costs to a minimum, and are ideal for permanent or temporary use.





When inquiring check CP 7446 opposite last page

#### CORROSION

## For sanitary drainage — copper tube in sizes to 6" OD . . .

offers non-clogging, corrosion-resisting advantages

Uses: As soil, waste, and vent lines in plumbing systems.

Features: In addition to offering the corrosion-resistant advantages of copper, tube provides smooth interiors and low frictional resistance to flow. Interior walls remain smooth throughout life of building. Clogging of copper lines is very infrequent.

Description: Copper drainage tube differs only in the wall thicknesses from tube sizes known as copper water tube. Tubes can be installed by a simple soldering operation, in which solder is drawn into the joint by capillary action.

Complete line of drainage fittings for soldered connection to copper tube is available. These fittings have long radius elbows and turns, and include also fittings with one or more outlets threaded for use with brass or copper pipe or with slip joints. Tube itself is available in standard sizes from 1½ to 6".

(For more information on copper drainage tube contact Copper & Brass Research Association, Dept. CP, 420 Lexington Avenue, New York 17, N.Y. . . . or for more information check CP 7447 on handy form which is located opposite last page.)

## Describes properties of Teflon rods

Physical properties of two grades of Teflon rods available to fabricators of Teflon parts are described in four-page folder. Typical uses for rod are presented as is size information.

Bul AD-149 is issued by The Garlock Packing Co., Dept. CP, Maple Ave., Palmyra, N.Y. . . . or for more information check CP 7448 on handy form opposite last page.

#### Are you missing the corrosion resistance of PYREX® pipe because you think it will break?

A plant manager says this about PYREX pipe: "There was no breakage during installation. There have been no lines broken because of the product handled, the temperature involved, or the age of the pipe. In short-there has been no breakage."

Product lines in this plant have been Pyrex pipe since 1943, Before the company switched, corrosion in the metal lines made cleaning difficult, frequent replacement made maintenance costly.

Engineers and operating men in hundreds of plants are running hard-to-handle fluids like sulfuric, hydrochloric, nitric and acetic acids; chlorinated hydrocarbons, hydrogen peroxide, bromine, brines and low concentration alkali solutions through their Pyrex pipelines with no problems whatsoever

their Pyrex pipelines with no problems whatsoever. Your own pipe fitters can install Pyrex pipe. It's easy to clean. Maintenance is practically nil. It's durable and costs about the same initially as other corrosion resistant piping. But even if it should cost more than the piping you now use, Pyrex pipe would quickly make up the difference in low installation cost, low maintenance cost, long service.

Make this check—Probably plants near you use Pyrex pipe, know its value in terms of personal experience. We'd like to send you their names so you can talk to people who use glass pipe daily. Ask for a list. Use this publication's reader service for added information.



#### CORNING GLASS WORKS CORNING, N.Y.

Corning means research in Glass

When inquiring check CP 7449 opposite last page



## NOTHING BEATS Tefloni

Everywhere they're being used on chemical pumps and valve stems, packings made of R/M "Teflon" are doing a tremendously efficient job. With their help, it is possible to meet most any chemical packing problem. Carefully engineered and custom-built for

their applications, they are lasting longer in service and lengthening the life of the equipment they're used on. Actually, they're going a long, long ways towards making preventive rather than corrective maintenance possible. Write for complete information.

\*Du Pont's trade-mark for its tetrafluoroethylene resin



### PACKINGS

RAYBESTOS - MANHATTAN, INC. PACKING DIVISION, MANHEIM, PA.

When inquiring check CP 7450 opposite last page

CHEMICAL PROCESSING

Quickemploy Teflon

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Uses: valves v Features from b

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Valve

An adju

when of Another desired valve in mounting (Toggle CP, 145)

opposite

Reasons

Statistics, concern to chemical for chemical

As an in 54,000 er tutions . only abou

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Quick-acting toggle valves employ plastic seats, Teflon packing . . .

can be used in high-vacuum service or with operating pressures to 1000 psi

Uses: In applications requiring ½th to ½" valves with operating pressures to 1000 psi.

Features: Bodies of toggle valves are machined from bar stock, with valve seats of semi-hard plastic, corrosion-resistant material. Brass valves

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Valves can be direct panelmounted without any modification

have O-ring seals and stainless steel types are available with either O-rings or Teflon chevron packing.

#### Description:

Toggle valves have hardened steel cams to provide valve seat closing action for high vacuum service. Leakage during opening and closing will not exceed 0.01 micron liter per cycle.

An adjustable cap nut allows for tight seating closure when operating lever is at right angles to stem. Another adjustment permits lever to travel in any desired plane parallel with stem. Safety pin to lock valve in closed position can be supplied. Direct panel mounting is possible without modification.

(Toggle valves are a product of Hoke, Inc., Dept. CP, 145 S. Dean Street, Englewood, N.J. . . . or for more information check CP 7451 on handy form opposite last page.)

THAT'S INTERESTING

#### Reasons for concern

Statistics, usually dry, become vitally important when they concern the future of an industry. . . in this case, the chemical industry. For example, despite a growing need for chemists, the percentage of high school students studying chemistry is actually less now than half a century ago (7.72% in 1900; 7.6% in 1952). Other science subjects show even more marked decline. Only 4.5% of ninth-grade entrants received college degrees in science (1944-52).

As an interesting comparison, last year there were some 54,000 engineers graduated from Russian educational institutions . . . American universities and colleges produced only about 20,000. And, incidentally, about 25% of the engineers in Russia are women.



## These 4 great, new Anti-Corrosion products lead the league!

1 PRUFCOAT New "A" Hot-Soray Vinyl Gives Greater Mil Thickness, Improved Film Density, Better Adhesion — At Lower Cost!

Now, the performance-proven Prufcoat "A" Series Vinyl has been adapted and specifically engineered for the modern, cost-saving technique of hot-spray application. Prufcoat "A" Hot-Spray Vinyl gives you greater mil thickness (4-5 mils in a single spray pass), improved film density (no porosity or pinholing) and better adhesion (to primers and even to bare metal) at lower cost per sq. ft. of surface. With the same dry-film compostion as Prufcoat "A" Series Vinyl, this hot-spray vinyl provides controlled thickness up to 10 mils in a cross-pass spray coat. You effect substantial labor and material cost savings.

New! PRUFCOAT Odorless Chemical-Resistant Coatings Eliminate Odor Problems Heretofore Created by Chemical-Resistant Painting

Perfected after six years of intensive development and test, Prufcoat Odorless Chemical-Resistant Coatings provide highest resistance to acids, alkalies, and other chemicals. Scrubbable 24 hours after application, Prufcoat Odorless Coatings withstand extensive scouring and cleaning. There's no odor during application, no odor during curing of film, and no odor thereafter. Ideal for use in confined, poorly ventilated areas. Suitable for application over wood, metal, or concrete. No wrinkling or lifting of old paints. Easy to apply, and supplied in a variety of colors. Effects substantial savings by eliminating shut down time and other costly annoyances.

3 PRUFCOAT New Fast-Dry Primer P-50
Lets You Over-Coat In Just Two Hours!

The famous Prufcoat Primer P-50, proven best by five years of tested-in-use applications, now with new

fast-dry action. All the unequalled advantages of the finest universal metal primer on the market, plus 2-hour drying time! You do your complete coating job from primer to top coat in just one day. This heavy bodied, rust inhibitive oleoresinous metal primer insures 2 mils or more thickness in the prime coat alone. Prufcoat Fast-Dry Primer P-50 provides positive primer-to-surface and top coat-to-primer adhesion. Only wire-brush and scrape surface preparation is needed, and yet Prufcoat Fast-Dry Primer P-50 absolutely controls underfilm corrosion and rust creepage.

PRUFCOAT "Gloss" Mastic The Perfected Vinyl Base Mastic With Exclusive "Gloss" Finish That Substantially Improves Chemical Resistance, Gives Measurably Better Appearance

This exclusive mastic formulation, based on vinyl and other chemical-resistant resins, gives exceptionally heavy build in cross-coat spray application, using conventional cold spray equipment. Flexible, heavy bodied, with a high solids content, Prufcoat "Gloss" Mastic provides a tough and substantial coating over rough and hard-to-protect structural or machine areas including rivets, welds, angles, and edges. This high build, combined with the proven chemical resistance of vinyls makes Prufcoat "Gloss" Mastic an important new corrosion-control tool.

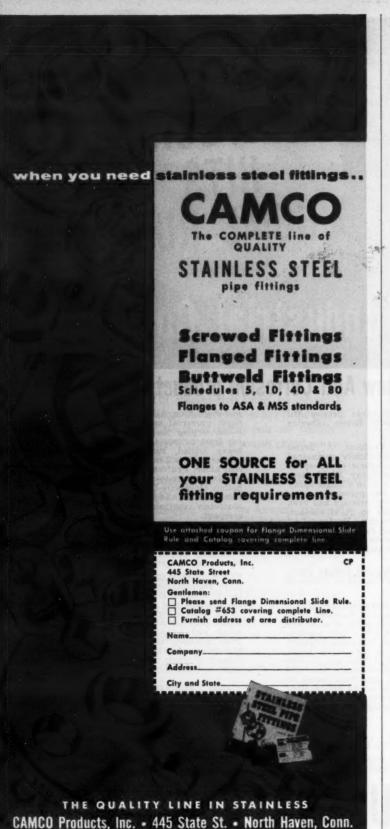
You score with this big league Prufcoat team on your side. It covers the field and bats 1.000 this season with products engineered and test-proven to solve the toughest corrosion problems. Get these Prufcoat winners going to bat for you in your fight against corrosion by writing today for complete information on properties, benefits, costs, specifications, and application techniques of these four major new product developments. No obligation, of course.

## PRUFCOAT

LABORATORIES INCORPORATED

Sales Office: 50 E. 42nd Street, New York 17, N. Y. Plant: 63 Main Street, Cambridge 42, Mass.

When inquiring check CP 7452 opposite last page



When inquiring check CP 7453 opposite last page

CORROSION

Plastic ends suit pumps for corrosive service in proportioning . . .

assemblies convert metal pumps to plastic end

Uses: In proportioning applications where highly corrosive liquids are being handled.

Features: Units are offered with two types of plastic liquid ends. Pump body and check valve assemblies are manufactured of unplasticized PVC or Kel-F.

Used in conjunction with ceramic pump plungers and ceramic check valve balls, these plastics offer excellent resistance to such fluids as ferric chloride, sodium hypochlorite, and hydrochloric, hydrofluoric and nitric acids.



PVC or Kel-F used in pump assemblies

Plastic liquid end assemblies and check valves are also available to convert existing metal pumps (of same type) to plastic construction, and are interchangeable with metallic liquid ends.

Description: Pumps with plastic liquid ends have capacities to 19 gph per feed and are all available in one, two, three, or four feed units. Pumps with plunger diameters from ½ to ½" may be used to develop pressures up to 300 psi; 5% to 1" plunger diameters may be used for pressures up to 150 psi. Maximum temperature at which PVC pumps can be used is 150°F; 250°F for Kel-F pumps.

("U" Type proportioning pumps are products of Pump Div., Hills-McCanna Co., Dept. CP, 3025 N. Western Ave., Chicago 18, Ill. . . . or for more information reader may simply check CP 7454 on handy form which is located opposite last page.)



Thickness and film density is what counts in a paint film. And in TYGON "ATD" Hot Spray Paint you get both—plus *real adhesion*. And, of course, you get all the corrosion-resistance for which Tygon Paint is famous.

Write for all the details today!
PLASTICS AND SYNTHETICS DIVISION

## U. S. STONEWARE

Fince 1865 . Akron 9, Ohio

100

When inquiring check CP 7455 opposite last page



#### Interesting 32-page Handbook shows what NoDrip is

and what it does.

SEND COUPON TODAY

SEND NoDRIP HANDBOOK

NAME\_\_\_\_\_\_\_
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CITY\_\_\_\_\_\_STATE\_\_\_\_\_

J. W. MORTELL CO. • 530-F BURCH ST. • KANKAKEE, ILL.
TECHNICAL COATINGS SINCE 1895

When inquiring check CP 7456 opposite last page
CHEMICAL PROCESSING

PLA-SA COST

The PLA-Thas been in West report in West report and already creecest since in had lasted a The tank

The tank steel billets regia at roo solution of PLA-TANK these fume failed.

PLA-TA solving prochemical a They replace lead and coated with phenolic place

PLA-TAI resin-bonde now resista fumes and to fore. PLA-7 to install, co

Let us hel the modern Write today

PLA-

THE CHEI

When inc

## THIS PLA-TANK® HOOD SAVED ITS **COST IN A YEAR**



The PLA-TANK Hood shown above has been in continuous use at General Electric's small aircraft engine department in West Lynn, Mass., for over a year. Reports indicate that it is still as good as when originally installed, is already credited with saving its entire cost since no previously used material had lasted over a year.

The tank is used for etching stainless steel billets; solutions used are aqua regia at room temperature and a 50% solution of muriatic acid at 180°F. PLA-TANK has successfully withstood these fumes, where other materials failed.

aint

DN

PLA-TANK products are daily solving problems of all types in the chemical and electroplating fields. They replace or outlast stainless steel, lead and ceramic linings, plywood coated with corrosion preventatives, phenolic plastics and asbestos cement board structures in many applications.

PLA-TANK, molded from long-life, resin-bonded glass fibre laminate, is now resistant to a wider variety of fumes and temperatures than ever before. PLA-TANK is light weight, easy to install, competitively priced.

Let us help you solve your problems the modern way - with PLA-TANK. Write today for free data sheets.

THE CHEMICAL CORPORATION opt. 63, West Warren, Massachusetts

When inquiring check CP 7457 opposite last page

CORROSION CONTROL

Temperatures in 1500-2000°F range withstood by silicone-porcelain pigmented coatings . . .

> used on ferrous metal surfaces such as boilers, stacks, high-temp lines, ducts, exhausts

Uses: Coatings are recommended for use on ferrous metal surfaces exposed to high heat, such as stacks, boilers, ducts, and high-temperature pipelines.

Features: Coatings are based on a silicone vehicle pigmented with porcelain frits, refractory materials, and colored pigments. Frits materials are designed to start fusing at temperature at which silicone vehicle decomposes. Thus, coating is converted into a porcelain-like finish at very high temperatures. Finish protects metal through all temperature ranges up to 1500-2000°F.

Description: High-temperature resistant coatings can be supplied in the following colors: aluminum, black, gray, olive drab, and oxide red.

Proper cleaning of surface is important to assure adhesion. Sandblasting is recommended. A minimum of two coats is necessary for proper protection. Application can be by brush or spray. Minimum dry film thickness should be 31/2 to 4 mils.

(High-temperature resistant coatings are products of Vita-Var Corp., Dept. CP, 48 Albert Ave., Newark, N.J. . . . or check CP 7458 opp. last page.)

Simple application combined with corrosion resistance in PVC lining . . .

> for use on large vessels, can be bonded to steel, concrete, wood

Uses: Lining of large tanks, vessels.

Lining is a continuous laminate of unplasticized polyvinyl chloride on one face and plasticized polyvinyl chloride on the other. Thus, the desirable strength and corrosion-resistance of unplasticized material is combined with the flexibility and ability of plasticized PVC to be bonded to steel, concrete, or wood.

The laminate, which does not require curing, can be installed quickly in equipment large and small.

Description: In use, lining resists a broad group of oxidizing and non-oxidizing acids, concentrated alkalis, salts, and many corrosive organic compounds. Since exposed face of lining contains no plasticizers or modifiers there is no danger of contamination of process reagents.

(PVC lining, called Vyflex FL-85, is a product of Kaykor Industries, Inc., Dept. CP, Yardville, N. J. Check CP 7459 opposite last page.)



You can pick the pedestal height and type of impeller you want.

And here's another saving - you don't have to buy a new pump when your conditions change. Thanks to the versatility of Ampco Centrifugal Pump design, you can make modifications in the field — quickly and inexpensively.

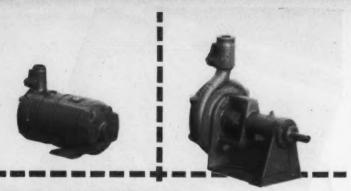
It pays to use Ampco Centrifugal Pumps in your tough spots. Speeds — 1750 and 3500 rpm. Capacities to 600 gpm. Heads to 300 ft. Write for latest literature.

\*Reg. U. S. Pat. Off.

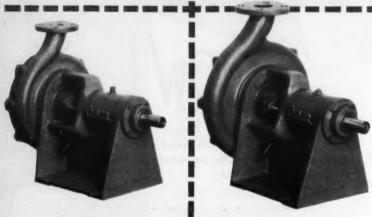


When inquiring check CP 7460 opposite last page

ING



## **OLIVER** Type L Centrifugal Pumps



## Compare these positive advantages . . .

**Self-venting** — high cut-water keeps air out . . . simplifies priming . . . holds prime better when pump is in operation.

 $\label{eq:simple_piping} \textbf{--} \text{ inlet and outlet connections in same vertical plane.}$ 

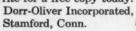
Large diameter impeller — single shroud type for high efficiency.

**Corrosion resistant** — all contact parts in 1'' size constructed of Carpenter 20 stainless... $1\frac{1}{4}''$ ,  $1\frac{1}{2}''$  and 2'' in Carpenter 20 or No. 316 stainless, bronze or cast iron.

**Interchangeable** — all parts on  $1\frac{1}{2}$ " and 2" sizes are interchangeable except for casing, cover and impeller.

This new pump is now available in four standard sizes. Bulletin No. 310 contains the information you'll want to have. Write for a free copy today.

Dorr-Oliver Incorporated







When inquiring check CP 7461 opposite last page

#### CORROSION

## Largest PVC pipe plant now producing

Largest plant now producing rigid polyvinyl chloride pipe in the country is making this pipe available in standard sizes from 1/4 to 2". Pipe can be threaded and is used with rigid PVC fittings available from the same company. In both normal and high impact varieties, pipe is made from B. F. Goodrich Geon.

Development of 3 and 4" pipe is taking place at the plant at present. It is anticipated that production of 6 to 8" sizes will begin at a later date.

(Rigid plastic pipe is a product of Easton Plastic Products Co., Inc., Dept. CP, 900 Line Street, Easton, Pa. . . . or for more information check CP 7462 opposite last page.)

#### Expand stainless use to cover welded construction

Company's highly corrosion-resistant Stainless No. 20 Cb plates, pipe, tube, bars, and forgings have been approved by the ASME for those applications which involve welding during fabrication, and for those in which parts must be placed in service in the as-welded condition.

Addition of Columbium to original Stainless No. 20 alloy minimizes precipitation of carbides during hot working. The steel can be welded by any of the standard electric arc and resistance welding processes. Oxyacetylene welding is not recommended.

Typical applications for the alloy include mixing tanks, heat exchangers, process piping, bubble caps, metal cleaning and pickling tanks.

(Stainless steel No. 20 Cb is a product of Alloy Tube Div., The Carpenter Steel Co., Dept. CP, 110 Springfield Rd., Union, N.J. . . . or for more information about manufacturer's product, reader may simply check CP 7463 on the convenient Reader Service slip which is located opposite last page.)



## Protect against wind driven rain, deterioration

The tough durability of rubber-base paint is now available for OUTSIDE use on industrial buildings. Masonry surfaces protected with this tight coat of rubber-base Cementkote resist moisture penetration. It does not streak, "burn", crack or flake. New or patched surfaces need no curing delay or priming. Rain simply washes it free of dust, dirt, smoke, soot!

FREE! Your business letterhead request brings full information.

Heavy-duty Paints since 1883

## TROPICAL PAINT COMPANY 1128-1234 West 70th St., Cleveland 2, Ohio Subsidiary Parker Rust Proof Co.

When inquiring check CP 7464 opposite last page

## Account For Corrosive Liquids

ALCOHOLS, VEGETABLE OILS, DEIONIZED WATER, ETC.,

with

Rockwell
"316"
Stainless
Steel Meters



#### Be Sure of Your End Product

Want the finest degree of quality control in your formulations? Need accurate cost controls over liquid ingredients? Is inventory a problem? Are losses eating into your profits? Then turn to a basic accounting tool—Rockwell liquid meters. Get the accurate metered records you need to operate efficiently. Available in a wide variety of types, materials and sizes to suit every requirement. Our bulletins tell all. Write today.

YOU CAN RELY



ON ROCKWELL

### ROCKWELL MANUFACTURING COMPANY DEPT. 106-F, PITTSBURGH 8, PA.

When inquiring check CP 7465 opposite last page

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(Welding Turns, a CP, 224 more info opposite

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pipe fittings assure optimum flow conditions and permanently-tight joints

Type 316 stainless steel employed by General Electric Company at Appliance Park, Louisville, Ky., provides adequate and economical protection against severe corrosive conditions encountered with its use of nitric, sulfuric, and phosphoric acids. Large quantities of these acids are employed in cleaning and pickling metals and alloys that go into G.E.'s major appliances.



Stainless nitric acid header at G.E.'s Appliance Park is fabricated with stainless welding fittings and 150lb flanges

The acids are stored at several tank farms located near the buildings they serve. They are pumped to work areas via under- and above-ground piping fabricated with stainless welding fittings and flanges. These fittings make possible the optimum flow conditions and permanently-tight joints necessary in handling severe corrosives.

Photo shows a 1½" Type 316 stainless nitric acid header fabricated with Schedule 10 welding fittings and 150-lb flanges. Concentrated acid at 40° Baume and room temperature is conveyed directly to equipment employed in metal and alloy preparation processes. Design pressure of piping is 100 psi. Operating pressure of the header ranges from 60 to 68 psi.

(Welding fittings and flanges are product of Tube Turns, a Div. of National Cylinder Gas Co., Dept. CP, 224 E. Broadway, Louisville 1, Ky. . . . or for more information check CP 7466 on handy form opposite last page.)



## Holding high vacuum with low upkeep is routine for these CRANE VALVES

At the Crosley & Bendix Home Appliance Divs., Avco Mfg. Corp. refrigerator plant at Richmond, Ind., a line vacuum within a few microns of absolute is applied to a dehydration process. But holding this vacuum wasn't always a routine operation.

There was a time when frequent valve failures caused production losses and costly maintenance stopped only when Crane Packless Diaphragm Valves were installed.

Of the valves formerly used, a multiple metal diaphragm type lasted about 3 months. Crowning of diaphragms caused restriction or closure and made the valves inoperable. Damaged diaphragms meant complete valve replacements.

In other valves, in-leakage at the diaphragm-to-stem connection made them unsatisfactory.

Now in service more than a year, none of the Crane Kel-F Diaphragm Valves has needed any maintenance. Crane simplified construction, giving a longer-life diaphragm...tighter bonnet seal and seating...and easier operation... is the reason.

The diaphragm in Crane design has longer life because it seals the bonnet only—is not subject to the cutting and crushing encountered when also used for seating. The separate, positive seating disc controls fluid even should diaphragm fail. Wide selection of body materials and trims. Ask your Crane Representative for Circular AD-1942.

Crane Co., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial



Areas.



## CRANE CO.

VALVES • FITTINGS • PIPI KITCHENS • PLUMBING • HEATING

CRANE'S FIRST CENTURY...1855-1955

When inquiring check CP 7467 opposite last page

ANY

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PILOT PLANTS . . . LABS . . . PROCESS INDUSTRIES

## here's your safest pumping unit



The leaders in small pump design, ECO ENGINEERING now offers a new, portable explosion-proof variable speed pumping unit.

This compact unit combines the time-tested ECO All Chem Pump with a manually controlled variable speed air motor.

It's the safest combination for handling hazardous or corrosive fluids and was designed for labs, pilot plants, chemical process plants, pharmaceutical and nuclear installations.

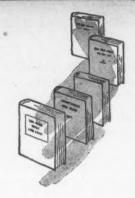
The ECO All Chem Pump is self-priming with non-volatile fluids and is readily available in a variety of construction materials suitable for dependable, low-cost pumping of non-abrasive fluids. ECO can make immediate shipment of the complete unit in capacities from 0 to 10 GPM and pressure to 100 PSIG.

CALL OR WRITE US TODAY!



When inquiring check CP 7468 opposite last page

## Recent Books



## Adhesion and Adhesive Fundamentals and Practice

Reviewed by F. A. HESSEL General Aniline & Film Corporation

These papers, read at a symposium held at the Case Institute of Technology in Cleveland, Ohio, and at a conference held in London, England, were prepared by the Society of the Chemical Industry at the suggestion of the Air Research & Development Command of the U. S. Air Force, and edited by Clark, Rutzler and Savage. They are principally concerned with systems involving high copolymers.

Literature and fundamental research on this subject are both meager as compared with the amount of work being done industrially to create new products. Numerous adhesives for use in structures and protective coatings appear constantly on the market but nearly all the basic problems involved in the field of adhesion are still unsolved. It was to stimulate such research that these papers were prepared.

The fundamentals discussed include: adhesion and types of bonds involved; theory of adhesion; possible surface factors involved in joint strength; adhesion of organic surface coatings; adhesions at solidsolid interfaces; surface forces of solids as affected by the polymerization properties of ions; energy of adhesion, molecular forces and adhesive rupture; relation between friction and adhesion; adhesion of high polymers to cellulose; development of a characteristic constant for the determination of adhesive properties of high polymers; the part played by fluids in adhesion; intermolecular forces and strength of adhesive joints; mechanism of adhesion.

Among the most important practical applications discussed, the following are of particular interest: types and uses of adhesives; adhesives for glass; adhesion in laminated glass; adhesives in wood-working industry; pressure-sensitive adhesion; air force elastomer adhesion problems; room-temperature setting adhesives for metals and plastics; adhesion of metals; adhesions in sizing textile fibers; industrial adhesives of vegetable and synthetic origin; adhesive compositions prepared from resin and rubber emulsions by admixture with hydraulic cements; non-destructive testing of adhesives by ultrasonic waves.

Physical and organic chemists interested in the subject of adhesives will find this a most stimulating symposium and well worth their attention.

To obtain "Adhesion and Adhesive Fundamentals and Practice" remit \$9.75 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N. Y. Specify CP 7469 opposite last page.

#### The Chemical Industry in Europe

(Staff Review)

This report on the development of chemical industries in the free countries of Europe has a dual purpose: 1) to survey the economic situation in the various industrial sectors of these countries, and 2) to show development of the chemical industry of Western Europe.

Falling in two parts, the report first briefly surveys the market situation in these countries and sets out the main economic aspects for the reader. The second part describes development of production and trade in different chemical sectors of the industry.

To obtain "The Chemical Industry in Europe" remit \$1.50 direct to Publications Office, The Organisation for European Economic Co-operation Mission, Dept. CP, 2002 P St. N.W., Washington 6, D.C.

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## reviews of current technical and reference works ... summarized for you by authorities in the field working with the CP staff

#### Organic Syntheses, Volume 34

Reviewed by ROBERT C. KRUG Associate Professor of Chemistry Virginia Polytechnic Institute

'Organic Syntheses, Volume 34", edited by William S. Johnson, will serve the needs of chemists in many areas of organic chemistry. The present volume includes thirty-four methods for preparation of organic compounds.

Two ring-enlargement methods for the preparation of cycloheptanone are described. One involves the formation of 1-(nitromethyl) cyclohexanol and its subsequent reduction and rearrangement whereas the other employs the action of diazomethane on cyclohexanone.

Three preparations of substituted benzenes are presented; these have a common basis in the rearrangement of the appropriately substituted quaternary ammonium compounds.

The procedures are well-written and the book appears to be free of errors with the exception of the typographical error (page 8) in the structural formula for  $\beta$ -naphthol.

Volume 34 extends the coverage of this very useful series.

To obtain "Organic Syntheses, Volume 34" remit \$3 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. When inquiring specify CP 7470 on handy form opposite last page.

#### Monomeric Acrylic Esters

Practical polymer chemists and engineers will find Edward H. Riddle's 221-page volume a useful and convenient handbook to the polymerization, copolymerization, and other chemical reactions of acrylic and methacrylic esters. The book is more than a review of the literature, since it includes some unpublished work, but it gives so little information on methods of synthesizing methacrylic and acrylic esters, and contains so few references to the patent literature of this important aspect, that the book might be more correctly entitled "Reactions of Acrylic Esters."

The emphasis on different methods of polymerization given in the book is not indicative of their relative importance commercially. Little more than one page is devoted to suspension polymerization.

Those interested in the sensational water paints and in latex paint will find the book worthwhile. However, it is not surprising that special methods for preparing acrylic ester water paints are not discussed. Dr. Riddle's book should stimulate the commercial use of acrylic ester monomers, especially in copolymerization with other monomer types. In this way, for example, permanent plasticity and permanent flexibility, which are needed to improve many commercial vinyl chloride polymer plastics, can be obtained. The book contains a fairly detailed table of contents, but no index. (C. E. S.)

To obtain "Monomeric Acrylic Esters" remit \$5 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

#### Reagent Chemicals and Standards

(Staff Review)

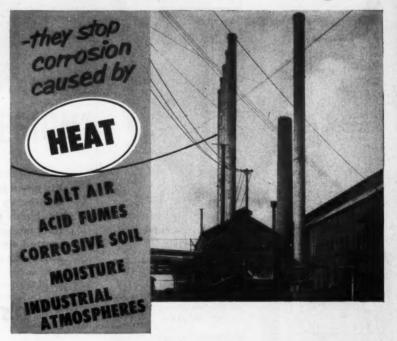
Over 600 reagents and solvents for analytical use — including inorganic and organic chemicals, acids, bases, and salts, oxidizing and reducing agents, special reagents for particular elements or compounds, indicators, and standard solutions — are covered in detail in 561-page volume by Joseph Rosin.

Methods for determining physical and chemical properties, values they should have, standards, and tests for determining their purity and suitability as reagents are given. To present the newer, more accurate methods and simplifications for testing is the expressed motive for this third edition. Many new reagents and solvents have been added.

Separate section devoted to special procedures, tests, indicators, volumetric solutions and tables of their equivalents is included.

To obtain "Reagent Chemicals and Standards" remit \$9.50 direct to D. Van Nostrand Co., Inc., Dept. CP, 250 Fourth Ave., New York 3, N.Y. When inquiring specify CP 7471 on handy form which is located opposite last page.

# You can solve your tough corrosion problems by using Bitumastic Coatings



TOUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes specialized protective coatings... the Bitumastic Coatings Koppers makes.

Take these stacks, for example. Heat caused ordinary coatings to "give up" in two weeks to a month. Then, one thin coat of Bitumastic<sup>®</sup> Hi-Heat Gray was applied. After four years' service, this specialized coating was *still* in good condition.

Hi-Heat Gray resists intermittent

temperatures as high as 1200° F. It contains metallic zinc powder which, at high temperatures, tends to fuse to the underlying steel, providing a protection similar to metallic zinc.

No one coating can stop all kinds of corrosion. Therefore, Koppers makes an entire family of Birumastic Protective Coatings. Send for free booklets describing them. At the same time, tell us about your corrosion problem so that we can recommend a method for its satisfactory solution. There is no obligation, of course.

#### KOPPERS COMPANY, INC.

Tar Products Division, Dept. 679-T, Pittsburgh 19, Pennsylvania DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

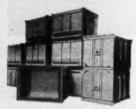


When inquiring check CP 7472 opposite last page

SING



Glasco has grown big by exceptional custom fabricating service to many of the country's leading chemical processors.



1-ten Storage Bins



Ingradient Containers

- The GLASCO plant is one of the best equipped on the Eastern Seaboard.
- ▶ GLASCO'S staff includes highly qualified technical men and craftsmen.
- ▶ GLASCO'S stocks of steel, stainless steel, aluminum, and other non-corrosive metals are kept always high.
- ▶ GLASCO is qualified to custom-fabricate, of metal, practically anything your process requires.
- Deliveries are strictly according to customers' requirements.

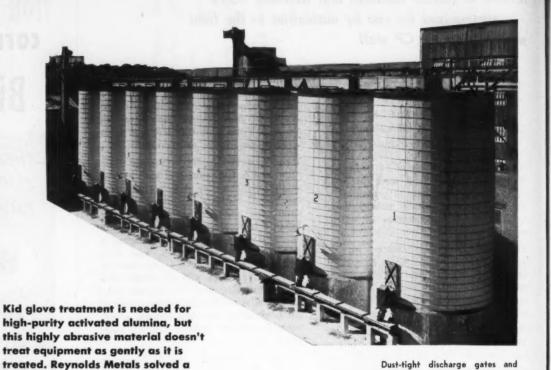
It will pay you to consult Glasco when you need metal handling equipment.

Write for free folder "Metal Equipment for Processing of Chemicals and Pharmaceuticals".



When inquiring check CP 7473 opposite last page

#### material handling



## oscillating action

-it's gentle but dependable

Problem: High purity activated alumina must be treated with care. It adsorbs moisture (among other things), fractures if treated roughly, and can produce plenty of first-rate abrasive dust which takes wearing surfaces apart in short order. Producer Reynolds Metal had the problem of meeting high purity and physical specs without putting conveying equipment in the "expendable" category.

conveying problem with . . .

At the Hurricane Creek plant (Bauxite, Ark.), Reynolds had to convey aluminum oxide trihydrate to calcining, feed calciner discharge (at about 500°F) to a bucket elevator, carry it up to 201 feet for discharge into selected storage silo, and take it from silos to a bagging station 126 feet away. None of this handling could be allowed to break alumina chunks — even in grades where they were about one inch minus.

Solution: Oscillating conveyors have been installed throughout alumina process. Aluminum oxide trihydrate is conveyed to calcining and calciner diseharge is taken by conveyors with troughs eight inches wide and four inches deep. Conveyor at calciner discharge can be unbolted, turned end for end, and is used to feed alumina to an aluminum fluoride preparation process. Since it weighs less than 1000 pounds, job of reversing it only takes about ten minutes.

conveyor to bagging station are

clearly seen in this picture of eight concrete stave silos



This conveyor is taking calciner discharge at 500°F, feeding it to aluminum fluoride preparation process. Ten minutes work allows conveyor to be unbolted, turned end for end to feed bucket elevator at left

stored storage of 201 troughs with m troughs it flow gates. L to a bu tion. Ex are fitt flexible Power 1 mounte Conveyi adapted even if through 3/2-inch Legs su be insul aid in c degrada ing part Loading or at pa

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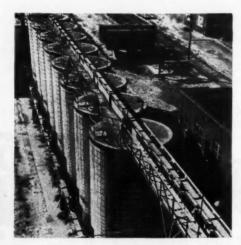
Three

Each day's production of activated alumina is stored in a concrete stave silo and is carried to storage by three conveyors spanning total distance of 201 feet. These are also eight inch by four inch troughs. Discharge into selected silo is achieved with manually-operated gates fitted to carrying troughs. When alumina is reclaimed from silos, it flows through manually-operated dust-tight gates. Larger conveyors (12" x 4") carry material to a bucket elevator which lifts it to bagging station. Except for calciner discharge unit, conveyors are fitted with dust-tight cover and dust-tight flexible connections at discharge ends and gates. Power to move alumina comes from 1 hp motor mounted on each conveyor.

Conveying action of oscillating unit is well adapted for handling lumpy abrasive material, even if hot. Drive eccentric causes deck to oscillate through a short arc. This arc or "throw" is about 3½-inch 500 times a minute for alumina handling. Legs supporting the deck and drive element can be insulated from heat so that steel trough will aid in cooling product while handling it without degradation. Simple construction uses few moving parts, permits smooth, silent conveying action. Loading of the conveyor is not critical — efficiency is about the same whether conveyor operates full or at partial capacity.

Results: Hurricane Creek plant is now able to dependably move this difficult material. Power costs are not high, product is protected, kept dry, pure, unbroken. Dusting has not been a serious problem.

(Flexmount oscillating conveyors for this job were built by Link-Belt Co., Dept. CP, 307 N. Michigan Ave., Chicago, Ill. . . . or check CP 7474 opposite last page.)



Three oscillating conveyors end-to-end take alumina from calciner, deliver it to chosen silo through manually operated discharge gates



**Next:** Transmission was selected to match the power plant and geared to provide required speeds and acceleration. In conjunction with the largest builder of axles in the country, the drive axle was developed to match power plant and transmission.

Lifting mechanism was selected to meet requirements and to be coordinated with power train and other components. *Mast* was engineered for the maximum safe lift, within the stability ratio of the frame which was designed for exceptionally low center of gravity. The standard Baker wideangle steer, rubber mounted, trailing axle was modified to match the other elements.

Result: 100% Balanced Design

-another Baker "First".

Baker "FG" gas fork trucks are available with 3,000, 4,000, 5,000 and 6,000 pound capacities. Specific bulletins can be obtained by writing The Baker-Raulang Company, 1208 West 80th Street, Cleveland 2, Ohio.

Balker
HANDLING EQUIPMENT

## 8 REASONS WHY THE BAKER FG FORK TRUCK IS FIRST IN ITS CLASS...

1. LOWER INITIAL COST

FG-40 (4000 lb.) \$3915. Other models at proportionate savings.

2. LONGER WARRANTY PERIOD Baker quality permits full 6 months' warranty.

3. HIGHER LIFT

Mast design allows higher standard lift than ordinary trucks.

4. LOWER MAINTENANCE COSTS

Designed for easier and less frequent servicing.

5. MORE MANEUVERABLE

Short turning radius cuts aisle width, adds floor space.

6. EASIER TO OPERATE

Greater visibility . . . easy-towork controls.

7. GREATER STABILITY

Lower center of gravity . . . higher "stability factor" ratio.

8. BETTER BRAKING

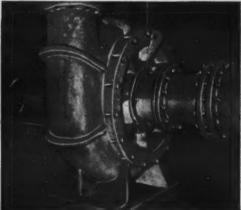
Full floating, self-equalizing, self-energizing brakes.

561

When inquiring check CP 7475 opposite last page

SING

## Continuous Low-Wear Non-Cloq Solids Pumping... At Lower Cost



low-speed wide-clearance SOLIDS

Actual working installation of a low-speed, wideclearance Morris Solids Pump which handles fine solids at a rate of 6,000 gpm at 52' total head. Pump speed only 370 rpm, 14" suction opening, 12" dis-

here total heads do not exceed about 120 feet, lowspeed, wide-clearance Morris Type-M Solids Pumps will handle solids ranging from fine abrasives up to pieces 11" in diameter. The low-speed reduces the abrasive action of the smaller particles, the large clearance allows larger solids and "tramp" pieces to pass without trouble.

#### Longer Wear, Easier Maintenance

Designed so that the most important wearing parts receive the least wear, initial high mechanical and hydraulic efficiencies are maintained throughout the longer service period of the pump. Double-thick wearing parts are sub-divided and protected so that the greatest erosion is taken by easily replaced segments. That means speedy, easy renewal, less down-time and lower maintenance cost.

#### Free Consultation

Morris engineers are always available to discuss and study your pumping problems with you. Describe your needs in a letter-or call your nearest Morris office. Our recommendations are free-entail no obligation. Write for Bulletin 175 which describes the Type M Solids Pump in detail.

#### MORRIS MACHINE WORKS

Baldwinsville, N. Y. Sales Offices in Principal Cities



When inquiring check CP 7476 opposite last page

#### MATERIAL HANDLING



Collapsible canvas container is available with zipper, straps, and other closures for protection of contents

#### Handle bulk materia without boxes

canvas container collapses flat with base when not in use or for return shipment

Container permits handling bulk solids without need for rigid boxes. Canvas container collapses flat with base when not in use or for return shipment. When tiering posts are set up, canvas container is raised to form bulk container which can be used for bulk solids, granules, powders, small and light parts and many other items.

Container can be furnished in canvas, duck, waterresistant materials, rubber or plastic. It is available



Container collapsed for return shipment. Units can be stacked for compactness

## Let's Keep it QUIET!

Cleveland quiet-type Air and Electric Vibrators positively eliminate arching and bridging in bins. They do it efficiently, economically and. . .quietly.

Literature on request.



2706 Clinton Ave. - Cleveland 13, Ohio

When inquiring check CP 7477 opposite last page

CHEMICAL PROCESSING

with zippe of content Standard s x 24". It and tiering (Canvas co Dept. CP,

> **Dust-free** of bulk m

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conveyor rail car th one man. Descriptio

Features:

articulated



Portable ing loadi

from a po Screw con boxcar an open botto

It has de dust and tional load blowers, o capacity of

(Loader i Machine \ Fresno, Ca

with zipper, straps, or other closures for protection of contents; or open-top with hook-on container. Standard sizes are 32" x 40" x 24" and 40" x 48" x 24". It is supplied with aluminum or steel base and tiering posts.

(Canvas container is a product of the Paltier Corp., Dept. CP, 1701 Kentucky Street, Michigan City, Ind. . . . or check CP 7478 opposite last page.)

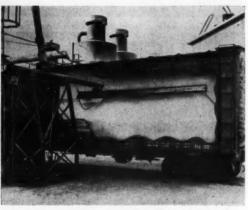
### Dust-free, non-segregating loading of bulk material in boxcars . . .

portable loader is designed to eliminate dust

Uses: For boxcar loading or segregating mixtures of materials such as cottonseed meal, soybean meal, mixed feed grain, etc. It will also handle soil sulfur and other minerals which are shipped in bulk cars where size and gravity segregation is undesirable.

Features: Special low-friction bearings enable conveyor to be jack-knifed for removal from rail car through door. Frame is easily moved by one man.

Description: Portable rail car loader consists of articulated screw conveyor system cantilevered

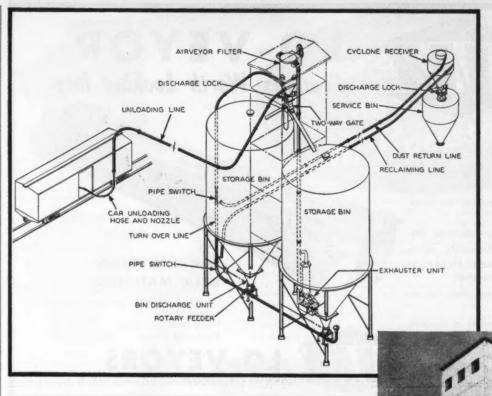


Portable car loader provides dust-free, non-segregating loading. Unit can be easily handled by one man

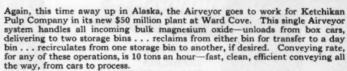
from a portable supporting frame outside boxcar. Screw conveyors carry material through door of boxcar and distribute it along length of car in open bottom section.

It has demonstrated effectiveness in eliminating dust and segregation encountered with conventional loading equipment such as belt type slingers, blowers, or gravity spouts. Loader has an average capacity of 20 tons per hour.

(Loader is a product of the Valley Foundry & Machine Works, Inc., Dept. CP, 2718 East Ave., Fresno, Calif. Check CP 7479 opposite last page.)



# ATRVEYOR does triple duty at Ketchikan Pulp Company's Ward Cove Plant



Ward Cove plant, the first major industrial plant in Alaska, has a daily production of 300 tons of high quality chemical cellulose, and is shipped to the United States and world-wide markets.

Many pulp and paper mills in this country and Canada use the Airveyor for the handling of their mill-supply chemicals, due to its inherent ability to perform, day in and day out, efficiently and with minimum attention and maintenance expense.

Over a quarter of a century of experience in air-conveying goes into every job. Fuller engineers are well qualified to make a thorough study of your conveying problems, and recommend equipment best suited to solve your needs, efficiently and economically. If interested in less costly materials handling, ask for an engineering study. We'll be glad to make our recommendations and you are under no obligation whatever for this service.





#### FULLER COMPANY, Catasauqua, Pa.

GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY
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When inquiring check CP 7480 opposite last page

Ohio

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FOR GAUGING LIQUIDS

OF ALL KINDS

100 AUTOMATIC

APPROVED BY

UNDERWRITERS

LABORATORIES





MATERIAL HANDLING

Lift truck and attachments perform variety of duties at paint plant . . .

speed up material handling while cutting costs

An attachment-equipped lift truck can be the "mechanical man" for saving handling overhead by performing grabbing, lifting, moving, climbing, stacking and towing. Pratt and Lambert, Inc., paint



Lifting and stacking—bags of gum are stored adjacent to varnish cooking room before mixing. Neat storage speeds production and keeps aisles clear

manufacturer, uses two 2000-lb capacity Hyster units at its Buffalo, New York plant to perform these tasks.

Both units are equipped with Hyster Load-Grabs, an attachment which exerts a side-squeeze permitting



Climbing—during foul weather seventy drums of resin per hour are unloaded from truck bed to dock and down steep, slippery ramp to storage

handling of drums and other awkward-to-handle shapes without pallets. The lift trucks are also counterweighted to permit handling of certain larger loads on 24" centers and have shorter uprights to



Towing—150 gallons of varnish mix are towed to milling room

By using of Pratt per cent. resin is u formerly 800 bags stored in

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CHEMICAL PROCESSING

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By using the Load-Grab equipped lift truck, some of Pratt and Lambert's costs have been slashed 50 per cent. Examples: a trailer load of 70 drums of resin is unloaded and stored in two man-hours where formerly four man-hours were required. A carload of 800 bags of pigment is palletized, unloaded and stored in five man-hours using one lift truck where formerly eight man-hours were required.



Grabbing-drums of varnish are filled from tanks by lift truck equipped with attachment and rubber-faced arms. After lifting to upright position, two drums are moved to storage and shipping at one time



Short uprights allow lift truck to clear small door openings in transporting two drums of resin

(Truck and attachments are products of the Hyster Co., Dept. CP, 2902 N. E. Clackamas St., Portland 8, Oregon. Check CP 7484 opposite last page.)

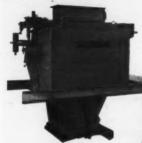


#### Does your plant need modern material handling methods . . . ?

check the handy Product Directory (pages 214 to 217) for a quick reference to ideas and equipment in this issue.



CLASS 50 Dust-tight, all-electric, high-speed, accuracy-indicating scale for weighing dry, ground, granular, dusty, nonowing and some small lumpy materials. Bulletin 3649.



CLASS 38 Dust-tight, heavy-duty scale for dry, ground, dusty, non-freeflowing materials, Bulletin 8946



Accommodates screw, belt, or vibrating feeder for handling wide range of materials. Dusttight, solenoid- or motor-operated discharge, accuracy-indicat-

CLASS 39

Self-contained, dust-tight, belt-

feeding and weighing unit.

Accuracy-indicating for process or intermittent batch weighing

of lumpy, crushed, sluggish ma-

terials, Bulletin 1549.





Richardson-designed panels such weighing systems composed of scales like those at the left.



Frankly, that's the reason we're running this ad-not to tell you about our products, but to ask you about your plant problems. Because if your business involves the handling of any materials or liquids by weight, we think you probably have an operation or two which just doesn't measure up in efficiency, economy, or speed. We'd like to know about it, because we think we can help.

You can call it pride, or conceit, or self-satisfaction, or self-confidence, but our engineers have never been stumped for long by a problem in materials-handling by weight—and in fifty years of working with the biggest names in American industry we've seen a lot of them! From aluminum sulphate, to zinc oxide, and back to almonds we've successfully installed Richardson units or systems to handle just about everything in the book, and built a lot of goodwill and a fair-size company in the process.

> Naturally, if a Richardson Scale can contribute to the smoother, faster, or more profitable operation of your plant, we'd like to sell you one. We think that our products and experience can help in solving your problem in processing, and if you'll outline it, we'll be glad to have one of our field

engineers arrange to go over it with you.

Or, if you'd just like to know more about Richardson Scales for possible future reference, simply clip this ad to your signed letterhead and mail. Bulletins 0450, 0550, and 0351 will be sent you by return mail-no obligation.

The Richardson Scale Company, Clifton, N. J., will be glad to supply information on:

Feeder-Weigher Systems • Automatic Bulk Weighing Hopper Scales • Automatic Bagging Scales • Bag Sewing Conveyors
Packers • Process Control Panels and Select-O-Weigh

Please write direct to our Clifton office, or to the nearest of our branch offices located in Atlanta, Boston, Detroit, Minneapolis, Cincinnati, Wichita, Montreal, Omaha, New York, Pittsburgh, San Francisco, Toronto, Buffalo, Chicago, Philadelphia, Houston, St. Louis.





CLASS 56 Self-checking, automatic feederweigher for large tonnage; practically continuous stream delivery. Beam system has approval of all weighing authorities. Bulletin 2140-2.



letin 0351.



**8** 8369

When inquiring check CP 7485 opposite last page



Flat Wire Mesh



Double Intermediate Crim



Single Intermediate Crims



Daubla Crimpa



Twilled Weave



Calendered Backing

Oblong Mesh



Plain Dutch Filter



Turble of Dutch City



NO MATTER HOW YOU BUY

# INDUSTRIAL WIRE CLOTH

in bulk from stock or special fabrications
YOU CAN RELY ON

# Cambridge

**COMPLETE LINE**—Cambridge stocks include a wide variety of specifications from the finest to the coarsest mesh in any metal or alloy.

**QUALITY**—Accurate mesh count and uniform mesh size are assured by individual loom operation and careful inspection just before shipment.

**PROMPT SERVICE**—You get immediate delivery on the most frequently used types of cloth. If your needs are not in stock, we'll schedule our looms to get your material to you without delay.

**CAMBRIDGE ENGINEERS,** both in the home office and in the field, are fully qualified to help you select the cloth to meet your needs, whether you order in bulk or special fabrications. In fabricating parts of any type . . . filter leaves, strainers, sizing screens . . . we'll work from your prints or draw up prints for your OK.

LET US QUOTE on your next order for wire cloth. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in your classified telephone book.

OR, WRITE DIRECT for FREE 80-page CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.



# The Cambridge Wire Cloth Co.

WIRE CLOTH

METAL CONVEYOR SPECIAL METAL FABRICATIONS

Department F, Cambridge 6, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

When inquiring check CP 7486 opposite last page

#### MATERIAL HANDLING

### Describes use of flowmeters in flumes and weirs

Illustrated two-page data sheet describes application and design features of a float actuated meter for measuring, indicating, recording, totalizing, and controlling flow in open channels.

Data Sheet 10.3-4a is available f r o m Minneapolis-Honeywell Regulator Co., Industrial Division, Dept. CP, Wayne & Windrim Aves., Philadelphia 44, Pa. Specify CP 7487 opp. last page.

### Drums become mixers using rotator . . .

1000 lb mixed, tumbled, etc, in original container

Floor model has been developed for rotating drums with loads up to 1000 lb. It can be used for agitating, mixing, and tumbling material in its original container.

Idler wheels can be adjusted for various size drums. Right angle geared-head, ½-hp motor can be supplied to meet any electrical specifications with drum rotating speed of 10 to 30 rpm.

(Rotator is a product of Morse Mfg. Co., Dept. CP, 727 W. Manlius St., East Syracuse, N.Y. Check CP 7488 opp. last page.)

### Shows soda ash slurry storage systems

Modern methods of handling and storing soda ash in slurry form are described in 16-page brochure. Brochure explains how paper mills, steel mills, textile mills, and chemical processing plants can effect economies in storing and handling soda ash in readily usable forms as a slurry.

"Soda Ash Slurry Storage" is available from Diamond Alkali Co., Dept. CP, 300 Union Commerce Bldg., Cleveland 14, O. Check CP 7488A opp. last pg.



When inquiring check CP 7489 opposite last page

# DRIBBLING IN BASKETBALL IS **OK...**

GIFFORD-WOOD CO.

HUDSON, N. Y. AND PRINCIPAL CITIES





# CHEMICAL PLANT

A good dribbler may be worth his weight in gold ... in basketball, but in your plant, dribbling expensive granular fines through poor fitting bucket lips can result in costly contamination.

Blaw-Knox Chemical and Fertilizer Buckets are designed with tight-fitting lips to prevent leakage. They stop the dribbling away of your profits. These cast alloy steel lips also resist abrasion and prolong bucket life.

For a detailed description of the important features in Blaw-Knox Buckets, write for Bulletin 2378 today.



#### BLAW-KNOX COMPANY

Blaw-Knox Equipment Division
Department 761
Pittsburgh 38, Pa.
Offices in Principal Cities

When inquiring check CP 7490 opposite last page

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Booklet Dept. Check

Faster, safe handling of crates possible with spring device for fork trucks . . .

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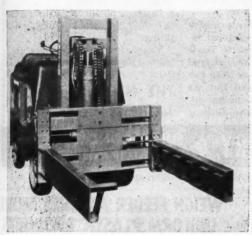
page

entire clamp operating mechanism can be detached, replaced with standard forks

Uses: For handling all types of crated material.

Features: Entire clamp operating mechanism can be detached quickly and easily and replaced with standard forks or other attachments.

Description: Originally designed to handle crated water heater, clamp attachment can be used to handle many other crated materials. Springs



Spring device provides safe handling of crates

mounted along entire inner length of each arm contact crossmembers of the crate. At points where they come in contact with vertical members, springs compress preventing damage to crates or contents.

(Crate Clamp is a product of the Towmotor Corp., Dept. CP, 1226 E. 152nd St., Cleveland 10, Ohio . . . or check CP 7491 opposite last page.)

### Shows applications and features of truck-mounted containers

Illustrated booklet of 12 pages describes material handling system which uses truck-mounted, detachable containers. System uses one man to pick up, haul, and dump pre-loaded containers.

Applications, operating details, types of containers, and materials of construction are included. Sequential photos show how system is utilized in various industries.

Booklet 1045 is available from Dempster Brothers, Dept. CP, Springdale Ave., Knoxville, Tenn. Check CP 7492 on handy form opp. last page.

# HOW TOUGH CAN CONVEYING GET?



A 55' Carrier Heavy Duty Conveyor. Capacity: 20 tons-per-hour of hot sintered coke. One 5 HP drive.

Check this list . . . see if you know of a material that is harder to handle than any of these.

ROCKET FUEL POWDER
HOT CEMENT CLINKER
FLY ASH

DRIED SEWAGE SLUDGE
COKE BREEZE
DRY CALCIUM CARBIDE
TITANIUM DIOXIDE
WET SUGAR
SILICON-CARBIDE
MACHINE TURNINGS
SINTERED ORE
SLAG
CORROSIVE CHEMICALS
FRAGILE CRYSTALS

THE materials at right, above, have one thing in common: they are all being conveyed efficiently and economically with Carrier Natural-Frequency Conveyors.

Here's why plants processing these materials turned naturally to Carrier Natural-Frequency:

A lot of the materials had proved too sharp or oily for belt or flight conveyors. Others were so sticky they made screw conveyor cleaning a maintenance nightmare. Still others were too abrasive for apron and conventional vibrating conveyors. Some were subject to spillage in any ordinary conveyors.

Carrier Natural-Frequency Conveyors solve all these problems. These amazing conveyors substitute the natural resonant action of coil springs for brute force. They require little, if any, more power to operate, empty, than to run the motor alone. And remember, the lower the power requirements, the lower your maintenance.

If you've got a material that's giving you conveying troubles of any kind, just jot it down on the coupon. The Carrier Natural-Frequency Conveyor may solve yours.

# CARRIER NATURAL-FREQUENCYVIBRATING EQUIPMENT

Carrier Conveyor 201 N. Jackson St.,	Corporation Louisville 6, Kentucky
Gentlemen: We've been having trouble with	
-	
	Without obligation
please send Carrie	r Natural-Frequency Bulletin No. 111
Firm	
Street	
City	State
Att: Mr.	Dept.

When inquiring check CP 7493 opposite last page



When inquiring check CP 7494 opposite last page

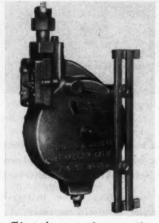
#### MATERIAL HANDLING

Replaces counterweight, cable in tank gage . . .

> applicable to all low pressure petroleum storage tanks

Fully automatic tank gage incorporates motor to replace counterweight and cable assembly. Use of motor reduces friction, compensates for tape pay-out and reeling in, maintains constant tape tension, and is said to make for greater accuracy throughout long float travel in tanks in a range up to 65 feet in height.

Gage has stainless steel tape with graduated markings in feet, inches, and 1/8th inches. Gage head is provided with large mounting bracket



This tank gages gives accurate readings of liquid level in tanks and is fully automatic

which accommodates full length slip joint. Adjustment of tape can be made at mounting bracket and slip joint, with final adjustments made with reading index pointer for greater accuracy.

Gage is applicable to all low pressure petroleum storage tanks. It can also serve underground tanks or can be used for roof mounting on above ground tanks.

(ST-8000 gage described above is a product of Shand & Jurs Company, Department CP, Eighth and Carlton Streets, Berkeley, California . . or for more information check CP 7495 on handy form opposite last

#### Interesting group of 6 NEFF & FRY BINS

\*

You see four bins in the photograph. There are two more of the 12 ft. dia. bins between the 20 ft. ones. All six are used for handling glass batch materials-lime, feldspar, silica sand, cullet, etc.

This is an example of the bins we construct all over North America for handling and storing scores of flowable bulk materials. In our long experience, we have designed structures and accessories to meet almost every conceivable situation.

The distinctive feature of a Neff & Fry bin is the diagonal, interlocking Super-Concrete Stave. Hoops of heavy galvanized steel rods cross the diagonals of two staves in each vertical tier. As many intervening hoops are applied as needed to give a safety



factor of five to one.

Our bins do not spall, rust, rot, or burn. They do not require face-

You are invited to communicate with us for literature and specific

THE NEFF & FRY CO. 166 ELM ST. . CAMDEN, OHIO

SUPER-CONCRETE STAVE STORAGE BINS

When inquiring check CP 7496 opposite last page



Write for complete details on EXACT WEIGHT Weigh Feeders for injection molding.



Exact Weig Better quality control Better cost control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio In Canada: P.O. Box 179, Station S, Toronto 18, Ont.

When inquiring check CP 7497 opposite last page

CHEMICAL PROCESSING

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RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by the Udylite process, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

Always

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and ROCC

Free Manual

DARNELL CORPORATION,

DOWNEY (LOS ANGELES COUNTY) CALIFORNIA 60 WALKER STREET, NEW YORK 13, NEW YORK 36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check CP 7498 opposite last page

Noiseless vibrator operates with steam or air . . .

unit has only one moving part—a steel ball

Uses: To provide noiseless induced vibrations to move stubborn materials in hoppers.

Features: Unit may be adapted for steam or air. When used with steam, return steam line keeps exhaust vapor confined and under control.

Description: Vibrator has only one moving part—a steel ball. Steam or air drives ball eccentric.



Shakes stubborn material out of hoppers quietly

Action shakes material out of hoppers. Unit will operate in any position. It is quieter than previous models because even exhaust noises have been eliminated.

(SDV-35 Vibrolator is a product of Martin Engineering Co., Dept. CP, Neponset, Ill. . . . or for more information check CP 7500 on handy form opposite last page.)

### Tells of device for guiding woven wire belts

Booklet of four pages describes selvage damage to woven wire belting. After a preliminary study of selvage damage, booklet gives details on a patented belt control mechanism. Device employs hyperbola pulley groove tilted at angle to plane of belt surface. This offers a revolving long direct line contact surface to guide woven wire belt.

In addition, device incorporates an axial movement, enables it to follow normal lift motion of belt. Guides can be used with heavy-duty rubber, steel hand conveyors, and other belting materials.

Booklet "The Guidler" is available from Knapp Mills, Inc., Department CP, 23-15 Borden Avenue, Long Island City 1, New York. When inquiring specify CP 7501 on the convenient Reader Service slip which is located opposite last page.

or shipping room \$50 years

# Standard cuts conveying costs in <u>either</u> or <u>both</u> places

To speed operations, reduce breakage, increase safety, save manpower, time and money — mechanize handling with Standard conveyors. It's an investment in efficiency that will pay you for years.

Standard can be of expert service to you on any conveyor need. This includes complete engineered systems of conveyors for production, assembly or packing lines . . . or a simple lightweight section of roller conveyor for "spot" use in warehouse or shipping room.

Standard designs and builds all types of "package" conveyors: power and gravity, belt, roller, slat, push-bar and special units as well as a wide line of self-contained portable work-savers.

The range, versatility and flexibility of Standard Conveyor equipment have been developed in nearly 50 years of service to industry. Call Standard's representative listed in your classified phone book. Send for Standard's General Catalog — address Dept. CP-65

#### STANDARD CONVEYOR COMPANY General Offices: North St. Paul 9, Minnesota

Sales and Service in Principal Cities

Standord

#### GRAVITY & POWER CONVEYORS

ROLLER . SLAT . WHEEL SECTIONAL . BELT . CHAIN . PUSH-BAR

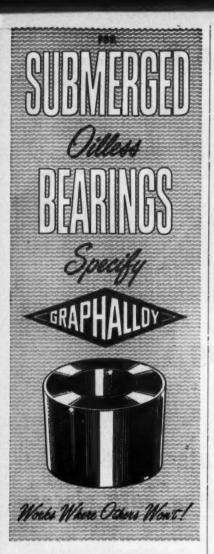
PORTABLE CONVEYOR UNITS:

HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR

HANDIPILER • LEVEL BELT • LITEWATE • HANDIDRIVE

PNEUMATIC TUBE SYSTEMS

When inquiring check CP 7502 opposite last page



- OPERATE DRY or SUBMERGED IN DYES;
   PLATING, CLEANING AND CHEMICAL SOLUTIONS; GASOLINE; FOODSTUFFS
- TRULY OILLESS AND SELF-LUBRICATING
- · EXTREMELY DURABLE
- CONSTANT COEFFICIENT OF FRICTION
- APPLICABLE OVER A WIDE TEMPERATURE RANGE — even where oil solidifies or curbonizes
- EXTENSIVELY USED IN CONVEYORS, PUMPS AND OVENS
- ROTATING SEALS OF GRAPHALLOY ARE UNEXCELLED

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Pleas	ERHAN AVE. * Yenkers, New York se send data on Graphalloy MERGED OILLESS BEARINGS.
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When inquiring check CP 7503 opposite last page

#### MATERIAL HANDLING

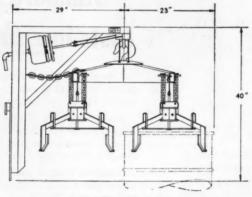
### Four drums handled at once with truck attachment

Attachment for fork truck can handle one, two, three, or four drums at a time. Pickup is controlled from driver's position by hand lever. One feature of unit is the fact that it enables operator to han-



Attachment for fork truck handles four drums at once. Lifting them by top reduces damage to drums

dle drums while still hot. Unit is made for any size or make fork lift equipment. It fits like any standard attachment. Although designed for loading, unloading, and stacking of standard 55-gal drums, special adaptations can be fabricated.



Specifications for drum handling attachment

(Drum Handler is a product of the General Machine & Welding Works, Inc., Dept. CP, P. O. Box 938, 1100 E. Second St., Pomona, Calif. . . . or check CP 7504 on handy form opposite last page.)

**Don't guess** what it costs to use the wrong pump... use handy nomograph (pages 196-198) to see how proper pump selection can save money.



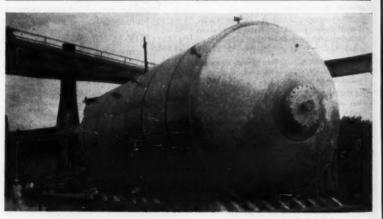
explosive gases are sometimes present, air motors of a well known make are used instead of conventional motors. The crane is controlled from the floor and embodies all the characteristic features of operation and durability for which Euclid cranes are well known.

If you have an unusual problem, Euclid engineers can render sound advice based upon many years of specialized experience. If you need a standard crane, there is a Euclid that will give smooth, efficient service for years to come with minimum repair and maintenance costs. Let us send you the new Euclid catalog.



The EUCLID CRANE & HOIST CO. 1368 CHARDON ROAD CLEVELAND 17, OHIO

When inquiring check CP 7505 opposite last page



#### COLE ALUMINUM TANKS

We have available stock sizes from 9,500 to 22,800 gallons for pressure storage, and tanks of 99.6% pure aluminum for hydrogen peroxide from 5,000 to 11,150 gallons. COLE can furnish tanks made of steel, aluminum and stainless steel—built in accordance with ASME Code—to meet all insurance requirements.



your inquirles for high pressure storage tanks, elevated tanks, acid or oil storage tanks, bins, boilers, stacks, etc.

When inquiring check CP 7506 opposite last page

CHEMICAL PROCESSING

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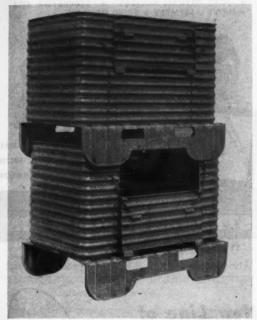
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Corrugated skid box has a skid attachment as an integral part of its construction. It can be picked up by fork trucks for easy transport and has provision for four-way entry of forks.



Stacking skid boxes have side doors for easy access to contents

Side doors drop down to allow easy access to contents when boxes are stacked. This is an optional feature. Boxes are built to any sizes and load capacity.

(Skid boxes are a product of Palmer-Shile Co., Dept. CP, 16016 Fullerton, Detroit 27, Mich. . . . or check CP 7507 opposite last page.)

### Describes ejector method of material handling

Illustrated four-page data sheet describes hydraulic materials handling system. Main feature of system is jet pump designed to pump mixture solids and water through transporting pipeline. Booklet describes how solids are transported by means of jet of high-pressure water issuing from converging nozzle at high velocity to entrain and mix with solids and discharge through a diverging throat.

Data Sheet Ea is available from the Allen-Sherman-Hoff Co., Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. Specify CP 7508 opp. last page.



#### CONVEYOFLO FEATURES

- ACCURATE . . . within ± ½ of 1% of actual weight from maximum to 50% of rated capacity; within 1% from 50% to 25% rate; within 2% from 25% to 10% of meter's rated capacity.
- COMPACT . . . weight sensing mechanism completely contained within conveyor structure.
- AUTOMATIC TOTALIZER COMPENSATION for variations in belt speed and belt weight.
- . RESPONDS ACCURATELY to rapid load variations.
- PACES AUXILIARY EQUIPMENT and operates secondary totalizers, indicators, recorders.

Bulletin 550-H4A gives full details on Conveyoflo. For your copy, write Builders-Providence, Inc., 387 Harris Ave., Providence 1, R. I.

BUILDERS-PROVIDENCE

DIVISION OF B-1-F INDUSTRIES, INC.



When inquiring check CP 7509 opposite last page



The simplest, most quiet answer for moving materials in hoppers, chutes and bins. One moving part, no lubrication, no maintenance, never harms the equipment on which it is mounted. Instantly self-starting every time. Vibrolator is the only vibrator that can guarantee this regardless of operating conditions. Write for catalog. You will also receive form for describing your problem. No obligation!



#### **VIBROLATORS®**

OVibrolator is a registered trade name and applies only to the pat-ented Peterson Vibrolator.



ENGINEERING COMPANY 155 KEMP ST. NEPONSET, ILL.

When inquiring check CP 7510 opposite last page

### MOST-SPECIFIED

FOR BULK STORAGE

by engineers and contractors

#### Kalamagoo **GLAZED TILE INDUSTRIAL** STORAGE BINS

- . MADE FROM FINEST FIRE CLAY **OBTAINABLE**
- . ECONOMICAL AND EASY TO ERECT
- HEAVY, MONOLITHIC CONSTRUC-TION
- · WEATHER PROOF, FIRE PROOF, CORROSION PROOF
- . MAXIMUM PROTECTION FOR **CONTENTS** against freezing, condensation, spoilage, contamina-
- LONG-LIVED . . . outlast most buildings.



It will pay you to get the Kalamazoo story

INDUSTRIAL STORAGE BIN DIVISION

# Kalamazoo TANK and SILO COMPANY

645 HARRISON STREET . KALAMAZOO, MICHIGAN

When inquiring check CP 7511 opposite last page

#### MATERIAL HANDLING

#### Moves heavy equipment, is easily assembled

lightweight skid of aluminum set up in one hour

Uses: For moving heavy equipment and machinery as well as for shipping and storage.

Skid can be assem-Features: bled and loaded in approximately one man-hour. Skid is available in 25 standard lengths which can be used as either headers or runners to assemble approximately 325 different skid sizes.

Description: Unit is made of heavy aluminum extruded members. Bottom faces of skid members have been made thicker than sides to compensate for wear over long periods of use. Bottom flanges have sufficient area to support heavy machines or equipment on earth or other comparatively soft surfaces as asphalt or wood block.

Rounded sides permit easy insertion of forks of lift truck for easy side lifting. Rounded contour of ends makes it possible to push skid easily along floor without interference from small, low projections. Completed 5 x 10' skid can be easily lifted by two men and has load-bearing capacity to 80,000 lb.

(Universal Safety Skids are a product of the Tumpane Company of Georgia, Department CP, Cochran Field, Macon, Georgia. Check CP 7512 on handy form located opposite last page.)

#### **Describes features** of drum cleaner

Booklet of four pages describes immersion type hot washing solution drum cleaner. Cleaning speeds, capacity, and automatic operation are described.

Gilco Traveler booklet is available from the L. M. Gilbert Co., Dept. CP, Schaff Building, 1505 Race Street, Philadelphia, Pa. Check CP 7513 opposite last page.

#### NOW YOU CAN BUILD YOUR OWN 5-A CONVEYOR WITH THE SECTIONAL SACO BELT CONVEYOR

includes the following components ready for assembly in your own plant: • HEAD and TAIL PULLEY ASSEMBLIES • NORMAL DUTY HOLDBACK • SPRING-TYPE BELT CLEANER • #745 CARRIERS • #745 RETURN ROLLERS • CONVEYOR BELT

. DRIVE ASSEMBLY . STEEL DECKING IN STOCK for



When inquiring check CP 7514 opposite last page

New Line of STAINLESS STEEL PAILS

at Big Savings!



**New Welded Construction Equals** Seamless or Spun

Entirely stainless (no solder) smooth surfaces - sturdy 24 gauge type 304 analysis stainless - improved shape for easier carrying, better balance - handles, ears, chimes of heavy-duty stainless. Our-standing quality at lowest cost. Backed by Metalsmiths' 30 years' serving process industries.

SEND YOUR ORDER TODAY PROMPT SHIPMENT

LOWEST PRICES -BIGGEST SELECTION ON THE MARKET

10 qt. - \$ 9.25 ea. 12 qt. - 10.25 eq. 11.25 ed. 14 qt. -16 qt. - 12.25 ed.

20 qt. - 13.50 es.

When inquiring check CP 7515 opposite last page

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Dept. CF or check JUNE, 19 Material weighed in conveying cars, then delivered to process via monorail

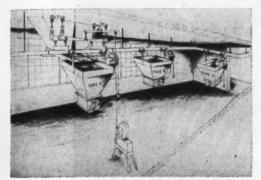
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Unusual method for weighing out bulk material and delivering it to process equipment is employed at the Firestone Tire & Rubber Co.'s Hamilton, Ontario, plant.

In this operation, bulk material (rubber pellets) is fed directly from screw feeders to hopper car suspended on a return monorail. Prescribed quantity



Hopper cars are automatically weighed and then move via monorail to process equipment

of material is automatically deposited in car, and its weight automatically checked.

Hopper car is then propelled along monorail to delivery point (Banbury mixer). After discharging it returns to loading station.

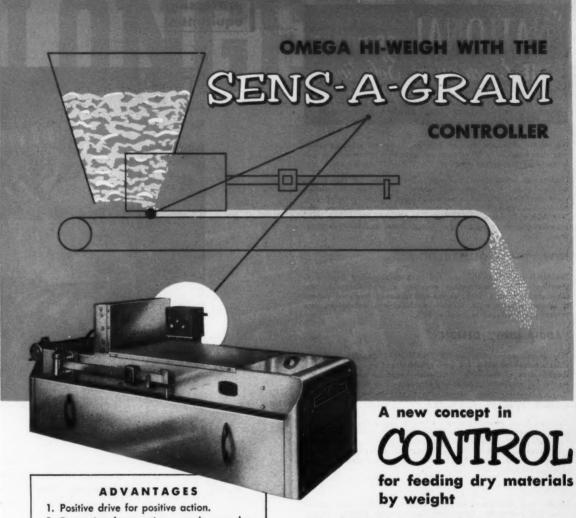
Each weighing is observed on large scale dial, and individual net weighings are recorded. Operation is set up and controlled from a remote panel board.

Section of monorail is hooked up to a scale-beam system and acts as scale, while hopper car acts as weigh hopper. Scale-beam mechanism is identical to standard beam arrangement used on the most automatic scales.

Feature of the system is automatic and instantaneous tare-weighing of hopper car before loading begins. Weight of the hopper cars runs between 450 and 500 lb. If weights were not tared, cars would of course have to be exactly the same weight in order to have each deliver identical weights.

Two monorail weighing systems, feeding two Banbury mixers, are in operation at the Hamilton plant. Hopper cars have capacities of 500 lb. Two grades of pelletized rubber, fed by two screw conveyors, may be loaded into car from each loading station. Weights are changed as many as three times a day in each system, depending on rubber being compounded. One man runs the entire weighing and handling operation.

(System was supplied by Richardson Scale Company, Dept. CP, Van Houten Ave., Clifton, N. J. . . . or check CP 7516 opposite last page.)



Proportional correction — made easy by Sens-A-Gram.

Built-in 100 to 1 Variable Speed Transmission.

Proportional agitation in the feeder hopper.

Available with Rotolock for floodable materials.

6. Built-in sampling gate.

Single power source — no auxiliary drives
 — easily explosion-proofed.

8. Available as a stream weigher.

Never before has a weighing feeder attained the accuracy of the OMEGA HI-WEIGH—the new feeder with the revolutionary SENS-A-GRAM CONTROLLER. Because of this simple mechanical controller, the OMEGA HI-WEIGH provides repeat accuracy well within ±1% ... in fact, tests prove deviation from actual weight is often virtually unmeasurable. If your processes involve feeding and proportioning dry materials ... either by batch or continuous methods ... you cannot afford to overlook the OMEGA HI-WEIGH with its SENS-A-GRAM CONTROLLER. Write for Bulletin 37-M1, today. Omega Machine Co., 387 Harris Ave., Providence 1, R. I.

# OMEGATHE LAST FEEDERS

DIVISION OF B-I-F INDUSTRIES, INC. BUILDERS : PROVIDENCE, INC.



When inquiring check CP 7517 opposite last page

page

ING

# "NATIONAL" PROVIDES THE Economical Solution TO Any Drying Problem!

No matter what your product may be, it can be dried or otherwise processed at a lower cost per pound or other unit, in one or more of the various types of "NATIONAL" equipment,

High-speed production; maximum effective use of the drying medium under finely adjusted control; adaptability to existing plant conditions and future expansion; and the assurance of long, trouble-free operation are among the important reasons why "NATIONAL" machines are being erected in more and more chemical plants throughout the United States and in other countries.

#### **NEW "P-4" CONSTRUCTION**

The result of a radically new approach to simplified Dryer construction, "P-4" Construction provides a precision-built, prefabricated structure, with trussed-and-tensioned insulated panels. It assures a more rigid, durable machine, with installation time in your plant reduced as much as 50%.

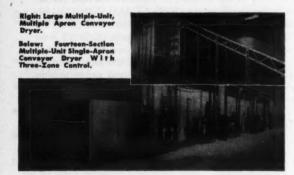
#### "ADD-A-UNIT" DESIGN

This unique accomplishment of "NATIONAL" engineering provides elternatives which are both practical and economical — [1] simplification of the initial installation based on present requirements; [2] maximum adaptability to step-by-step future expansion.

#### OTHER SPECIAL FEATURES

Patented Super-Power Fans, made in our own shops to specifications developed through years of industrial drying experience. Patented Indexing Orifices, Turning Vanes and other devices and arrangements assure unequalled versatility and precision in air distribution and control. The heat source may be steam, gas, oil or other medium.

Single and Multiple Conveyor Dryers; Cabinet and Tunnel Type Truck Dryers; Extruders; Drying and Baking Ovens; Equipment for Plastic Film and other Continuous Web Proc-

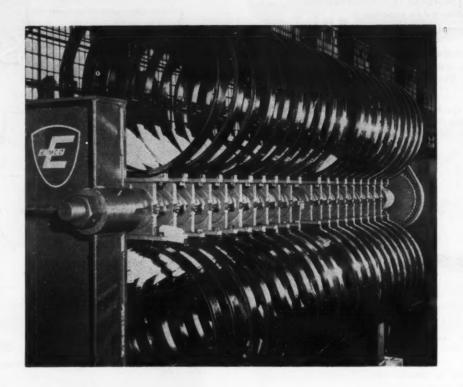




New England Agenf: JONES & HUNT, INC., Gloucester, Mass. Cable Address: "NADRYMA" — W. U. Code

When inquiring check CP 7518 opposite last page

#### processing equipment



Here's a "new twist" on the old, reliable plate-and-frame press: two sets of round frames swing in and out between fixed plates. One is filtering while other is being cleaned, so that a plant can —

# slash downtime increase filtering capacity

Uses: Filtering almost all materials in chemical, metallurgical, and food processing fields.

Features: Mechanized plate-and-frame design decreases downtime, increases capacity, and reduces floor space requirements. Unit has two sets of frames — permitting one to be cleaned while other is in use. This results in almost continuous operation. Changing from filtration with one frame set to another requires services of only one man and can be done in less than two minutes.

Description: Filter consists of two sets of frames mounted at 180° to each other, on a shaft rotated by either an air or electric motor. Plates are mounted stationary. While filtration cycle is in progress, one set of frames remains in "ready"

position. As soon as cake has formed and washing is completed, frames are rotated, and second set is positioned for next operating cycle, which can start immediately.

Feed slurry is introduced at center and bottom of frames through hose connections from feed inlet header. Settling out of coarse solids is retarded by upward current, producing an even filter cake on both sides of plate. By filtering a controlled volume of slurry (as determined by density) a split cake with ½ to ½" separation can be produced in each frame.

Wash water and air-blow are introduced similarly from separate headers. Water follows same path as feed and is forced through both halves of the at Salt I

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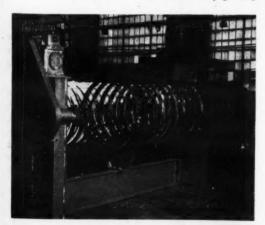
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Operating Data for Eimco-Burwell Filters at Salt Lake Tungsten Company, Salt Lake City, Utah (Three 30-frame units)

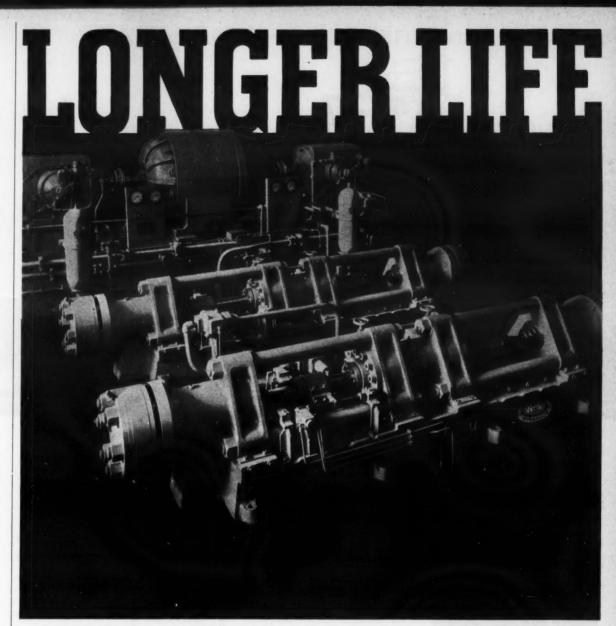
Material being filtered Tungsten is	each residue
Feed solids conc., per cent	45-55
Filter area, sq ft, (basis	
30 frames per set)	639
Filtration rate, dry lb solids	
per 24 hr per sq ft	282
Time of cycle, minutes	
Fill	4
Blow	5
Wash	10
Blow	5
Blowback	2
Open, rotate, inspect, close	2
Total	28
Cake WO <sub>3</sub> soluble content, % dry solids	0.02
Ib wash water to Ib dry cake solids	1 to 1
Filter cake moisture content, per cent	15
Filtrate clarity	sparkling
Final filtration pressure, psi	60

cake — resulting in faster washing and increased efficiency. Blow-back of air or inert gas frees cake from both sides of filter media, cuts cloth blinding. Rubber, neoprene, or other synthetics are used as gasketing between the steel frames and filter media. Sealing is effected by means of a bellowstype arrangement of the plates. Compressed air is

(Continued on page 121)



With one set of frames in operation, other set is in "ready" position. As soon as cake has formed and washing is completed, frames are rotated 180°, putting second set in filtering postion while first set comes out, with cake, for cleaning



For longer life, a high capacity, low speed Watson-Stillman intensifier unit offers you a sound approach to the solution of the problems of packing and fatigue at pressures up to 100,000 p.s.i. Because of its slower piston speed, and resultant low rubbing velocity, packings last longer. Slower cycling speed reduces the number of stress reversals, increases fatigue life in high pressure cylinder and valve block. At this low

speed of operation, you can expect 10 to 12 times the life of comparable high speed equipment.

High pressure intensifier units are only one of the Watson-Stillman "Completeline" of hydraulic machines and equipment. It will pay you to get in touch with W-S first, when it comes to vertical and horizontal pumps and accumulators, too. All W-S equipment is economical—both in first cost and operating cost.



When inquiring check CP 7519 opposite last page



# rotary kiln

# Burns Waste



Special Stainless Steel Batch Dryer for Drying Fine Catalyst without Dust Loss.



Two Complete Drying Systems, Can Be Operated Together—or Singly—to Meet Varying Plant Requirements.

. . . provides easy, economical, smoke-free disposal of still and tank bottom sludge, office waste, rags, food waste, and other oil refinery, industrial or commercial wastes.

• Material to be burned is raised in the skip bucket and fed into the brick lined kiln with a specially designed feeder. Kiln can be rotated at various speeds, permitting the burning time to be altered to meet changing requirements. Ashes are collected in the brick chamber. An auxiliary oil burner is provided for use when the materials are not readily combustible. Consult Bartlett-Snow on your next drying, cooling, calcining, waste disposal or other heat engineering problem. Our wide experience can save you both time and money!



Dryers · Coolers · Calciners · Kilns "Builders of Equipment for People You Know"

#### **PROCESSING**

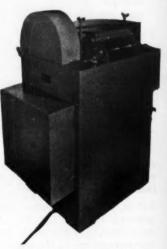
# Stellite-tip cutting edges minimize sharpening on pelletizer . . .

all parts on unit easily accessible for quick cleaning

Uses: Pelletizing extruded plastic strand material.

Features: All parts are easily accessible for quick cleaning. Stellitetip cutting edges provide long service life with a minimum of sharpening.

Description: Pelletizer is of all-steel construction, with feed, cutting chambers and pellet-discharge tube of stainless steel. Vari-



Pelletizer has rotor with eight cutting edges

able-speed drive transmission provides complete range of speeds for different extruder capacities. Rotor has eight cutting edges, eliminating need for individual knives.

(Strand pelletizer is product of Ball and Jewell, Inc., Dept. CP, 24-28 Franklin Street, Brooklyn 22, New York . . . or for more information reader may simply check CP 7520 on the convenient Reader Service slip which is located opposite last page.)

For more information on product at left, specify CP 7521 . . . see information request blank opposite last page. BURWELI (Continue

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5) 50% 6) 33% Experience operate to 30-35 min

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(Continued from page 119)

introduced from a header into the diaphragm between each pair of plates, causing diaphragms to move outwardly, thereby closing plates against frame. Sealing is performed without shock eliminating tearing or weakening of cloths. Plates are withdrawn from frames by applying vacuum to the diaphragms.

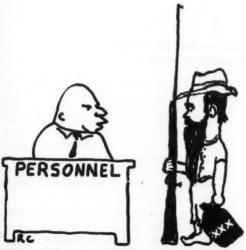
Filters can be constructed of mild steel, cast iron, rubber-covered steel, plastic-coated steel, stainless steels or other alloys, or of synthetic resins reinforced with glass fiber. Frame dimensions are presently limited to 251/2" ID by 1 to 3" thick (up to 40 frames may be used). In cases where flow of feed slurry does not fluctuate excessively, entire cycle can be automatically programmed. In this case, no direct labor is required.

Three 30-frame units have demonstrated the following estimated benefits after 12-month operational period (as compared to conventional filters):

- 1) 1700% more capacity per sq ft filtration area.
- 2) 60% reduction in solubles loss.
- 3) 50% reduction in wash volume required.
- 4) 95% reduction in filter media consumption.
- 5) 50% reduction in labor.
- 6) 33% decrease in floor space for filtration.

Experience has also shown that two men can easily operate three 30-frame filters, when working on 30-35 minute filtration cycle.

(Eimco-Burwell filters are products of the Eimco Corporation, Dept. CP, 634-666 South Fourth West Street, Salt Lake City 10, Utah . . . or check CP 7522 on handy form opposite last page.)



"I'm afraid your qualifications don't quite fit the distillation expert we had in mind."

#### CONTROLLED-VOLUME PUMPING with

# NO STUFFING BOX PROBLEMS!



The Pulsafeeder, in combining the good features of both piston and diaphragm pumps, provides an unusually dependable means of precision pumping. There is no stuffing box, hence the usual problems of maintenance and repacking associated with plunger-type metering pumps do not exist. The product being pumped is isolated from the pump's working parts by a hydraulically balanced diaphragm and is kept safe from contamination and leakage to atmosphere.





WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specifications of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 480Wilson Street, Le Roy, N.Y.

and discharges a like amount of liquid on the discharge

Positive displacement is achieved by a piston reciprocating within an accurately sized cylinder at an established stroke length, displacing an exact volume of hydraulic oil. By means of this oil, the piston moves the diaphragm alternately backward and forward. The displacement of this diaphragm travel takes in the liquid on the suction stroke of the piston

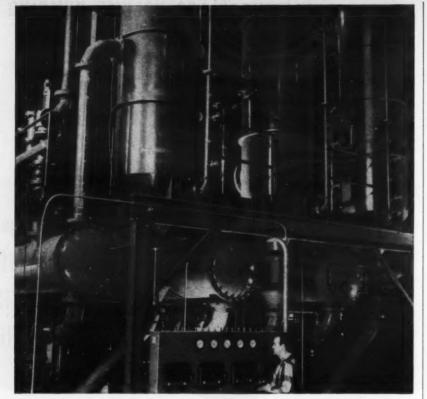
DISCHARGE STROKE



When inquiring check CP 7523 opposite last page

stroke of the piston.

This Buflovak Triple Effect Forced Circulation Evaporator concentrates lignosulfonates for the Marathon Corporation. It is made of stainless steel, and is simple in design, showing virtually complete recovery of solids. Automatic controls simplify operation.



# USING BUFLOVAK EVAPORATORS

# Marathon Corporation converts industrial waste into salable, profitable material

To turn a pollution problem into a profitable business, the Marathon Corporation, Rothschild, Wisconsin, decided to convert objectionable waste material to something useful.

The result is the widely used "Marasperse" dispersants, and "Maracelle," a water conditioning chemical.

These useful products are obtained by recovering lignosulfonates from sulfite spent liquor in a patented process developed by Marathon.

Evaporation plays an important role in the process, and this is performed efficiently, economically, by a Triple Effect Forced Circulation Evaporator designed and built by Blaw-Knox Engineers especially for this job.

Why not let Blaw-Knox Engineers study your by-product or industrial waste recovery problem, perhaps including small scale tests and experimentation on pilot plant scale in our Research and Testing

Catalog No. 351, By-Product Recovery, available on request



Laboratory, with a report to you on commercial possibilities, production costs, and characteristics of final products.

#### A complete process equipment service

By-product recovery is but one phase of Blaw-Knox Process Equipment design, engineering and fabrication service for the chemical, food, pharmaceutical, plastic and resin, petroleum, rubber and other industries:

EVAPORATION • DRYING • FLAKING • MIXING • IMPREGNATING • REACTION • VULCANIZING • CRYSTALLIZATION • DISTILLATION • HEAT TRANSFER • SOLVENT RECOVERY • SOLVENT EXTRACTION • GAS CLEANING • GAS ABSORPTION • POLYMERIZATION • VAPORIZATION • CONDENSATION • LOW AND HIGH PRESSURE PROCESSING • STERILIZING

**Everything in Process Equipment** 

# BLAW-KNOX COMPANY BUFLOVAK EQUIPMENT DIVISION

1645 Fillmore Avenue, Buffalo 11, N.Y.

When inquiring check CP 7524 opposite last page

#### **PROCESSING**

# Stainless steel heat exchanger designed for high velocities, rapid heating . . .

quick-opening heads expose all internal surfaces, provide for easy cleaning

Uses: Designed for continuous high velocity, rapid heating operations. Heater is especially applicable for handling heat-sensitive materials.

Features: Heads are quick-opening, completely expose all internal surfaces to facilitate cleaning. Provision for continuous condensate removal is also included.

Description: Basic heater unit is of shell-andtube construction with all product contact surfaces made of stainless steel. Provision is made within heater for steam distribution and thermal expansion by a combination steam distributor, thermal expansion joint, and baffled plate.

Heater is floor mounted. It can also be mounted in tandem or in any other location best suited for process. Units are manufactured in nine sizes.

Following are available as accessories:

- 1) Instrumentation for automatically controlling temperature of discharged product.
- 2) Vacuum system for guarding against burning of product in event of flow stoppage.
- 3) Recirculation system for providing high velocity product flow.

Positive displacement pumps for use with heater are also available (not standard equipment) and can be sized for individual requirements.

(Stainless steel heat exchangers are product of Oscar Krenz Incorporated, Dept. CP, Ashby Avenue at 6th Street, Berkeley 10, California . . . or for more information check CP 7525 on handy form opposite last page.)

# Features and advantages of precision graders

Features and advantages of precision graders for separating and sizing granular materials by thickness or width differences are outlined in four-page illustrated bulletin. Units use grooved-and-slotted cylinder shells for thickness separating and sizing, and shells with recessed round holes for width sizing and separating. Single, two-high, and three-high arrangements are available. Bulletin gives dimensions and details of the different arrangements.

"1-BC Carter Precision Grader" is issued by Hart-Carter Company, Dept. CP, 655 Nineteenth Avenue N. E., Minneapolis 18, Minnesota. When inquiring specify CP 7525A on handy form opposite last page.

Up to 900 by filters

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Uses:
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Features:
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depending of unit an of filter used. Resinated plea cartridge I fit of filter It is unaf water and tain 98% of ticles of 20 and larger.

Description

Designed if filtration, we quick-open for change tridges. No gasket seals er to filtrate tened by swell Large mod lifting desswings cov.

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Filters are in nine sizes ran overall d from 8 to 3 using from 36 cartrid Pac cartrid 1/2" diamo paper is for which will

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Up to 900 gpm handled by filters . . .

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use resin-impregnated pleated paper cartridges having 44 sq ft filtering area

Uses: Filtering wide variety of engine and industrial oils, coolants, solvents, and washing solutions.

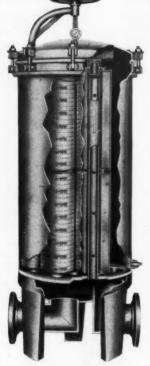
Features: Filters combine compactness with high flow capacity. Flow rates range from 25 to 900 gpm,

depending upon size of unit and number of filter cartridges used. Resin-impregnated pleated paper cartridge has 44 sq ft of filtering area. It is unaffected by water and will retain 98% of all particles of 20 microns and larger.

Description:

Designed for in-line filtration, units have quick-opening covers for changing cartridges. Neoprene gasket seals the cover to filter tank. Covers are fastened by swing bolts. Large models have lifting device that swings cover to one side when open.

Filters are available in nine different sizes ranging in overall diameter from 8 to 383/4" and using from one to 36 cartridges. Flo-Pac cartridge has



Cut-away shows interior arrangement of 12-cartridge filter. Unit is rated at 300 gpm

6½" diameter and is 18" long. Pleated impregnated paper is formed around perforated metal center tube which will withstand 100 psi. Outer cover of cartridge is also of treated paper. Cork gasket on each end acts as seal when cartridges are double decked.

Covers and filter bodies on all except two models are fabricated from heavy-gage formed steel. Two small models (using one and two cartridges) have tanks made from spiral-rolled sheet steel with electric-welded seams.

(Honan-Crane Full Flow oil filters are product of Filtration Division. Houdaille-Hershey of Indiana, Inc., a subsidary of Houdaille-Hershey Corporation, Dept. CP, 930 Sixth Street, Lebanon, Indiana . . . or for more information check CP 7526 on handy form opposite last page.)

• FASTER ULTIMATE DISPERSION, FASTER DISSOLVING WITH THE COWLES DISSOLVER

2 to 20 times faster! In ultimate dispersion, dissolving and disintegration of materials, the Cowles will do the job 2 to 20 times faster than conventional machines... will cut down your time per batch. You save on space. You save on labor. You save on horsepower. Cowles Dissolvers are easy to operate and clean, are of rugged construction, need little maintenance.

Where dispersion, milling and post-mixing are involved, the Cowles functions as an ultra-fast pre-mix unit-guaranteed to give all mills greater volume production—faster ultimate dispersion—and fastest post-mixing.

In chemical processing, the Cowles is an efficient, high speed reactor — offered in all types of corrosion resistant metals — with glass lined tanks — with all types of heating and cooling systems — to operate under pressure, vacuum or with reflux returns. For gas-liquid — for liquid-liquid — for solid-liquid reactions — investigate the Cowles.

The Cowles Dissolver is **extremely versatile**, adapting easily to any mixing, dispersion or dissolving job. It will be specifically engineered to meet the exact requirements of your operation.

if you process...
Plastics - Resins - Paints
Vitamins - Plastisels
Nitro-Cellulese Lacquers
Rubber Solutions - Inks
Various Chemical Agents
Organisels - Gum Solutions
Enamels - Biologicals
Coatings - Explosives

The Cowles Com

... the Cowles
Dissolver will increase
your production,
handle even high
viscosities,
increase profits!

HERE'S NEWS

A NEW DISSOLVER & MILL

COMBINATION FOR HIGH-SPEED,

HIGH-VOLUME PRODUCTION!

The news is — the owners of Morehouse Industries have purchased the Cowles

Dissolver operation of the Cowles Company, Inc. of Cayuga, N.Y. It means — an

unbeatable combination of processing equipment and technical know-how from one
source — available through an expanded Morehouse-Cowles distributing organization.

• FASTER... PARTICLE REDUCTION WITH MOREHOUSE MILLS

if you process...

Paints • Inks • Foods
Chemicals • Plastics
Lubricants • Ceramics
... you can increase
volume and profits
with Morehouse
Mills!



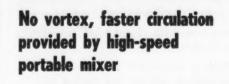
Morehouse-Cowles, Inc. 1150 San Fernando Rd. Los Angeles 65, Calif. Sales Offices in Principal Cities (Cable Address "MORESPEED," Los Angeles) These increases in production guaranteed...up to 4 times the volume of ordinary mills when used with conventional premixers...when used with Cowles the production jumps up to 10 times that of ordinary mills! For grinding, homogenizing, emulsifying, dispersing, disintegrating, blending, Morehouse Mills have been further improved to give even greater production volume!

Modern Morehouse Mills are low in first cost, easy to maintain, unusually compact, lightweight, completely proved in the field. Made only by Morehouse Industries of Los Angeles.

PRODUCTION WITH COWLES DISSOLVER-MOREHOUSE MILL COMBINATIONS!

Morehouse-Cowles sells speed — volume production — higher profits for your entire operation, gives you terrific flexibility in your production line! Ask for pre-test of your materials by Morehouse-Cowles technicians. Ask for full trials in your plant with any size equipment. Inquire about leasing arrangements and time payment plans in U.S. and Canada. Both the Cowles Dissolvers and Morehouse Mills are fully guaranteed. Write today!

When inquiring check CP 7527 opposite last page



blends, disperses, homogenizes; peripheral speed is from 60 to 100 ft/sec

Uses: For mixing, dispersing, and homogenizing paints, coatings, inks, drugs, foods, cosmetics.

Features: High-speed unit speeds up mixing cycles and provides uniform mix without vortex.

Mixer operates at peripheral velocities (along outer periphery of rotating rotor) of about 60 ft/sec to more than 100 ft/sec, depending upon size of unit. Mixer handles solutions having viscosities to 30,000 cp.

Units are easy to disassemble. Rotors may be interchanged to suit individual requirements of any particular batch.

Description: Mixer produces relatively homogenous emulsions and dispersions in particle sizes ranging from less than 1 to about 50-75 microns. In operation, entire mass of materials being mixed is kept in constant circulation, drawing in at the

open base of rotor sleeve (filling vacuum created by ejection of material at top of sleeve and pull of rotor), then striking baffle plate and turning down to repeat cycle until thoroughly mixed. Circulation is set up as soon as rotor is in motion.

High-speed mixer handles

solutions having viscosities up to 30,000 cp

Mixers are available in various sizes ranging from 1/3 to 30 hp. Smaller units are powered by single-phase, 110-volt, 10,000-rpm motors, with control rheostats. Larger mixers are furnished with 220/440-volt, 3-phase, 60-cycle motors. In the latter, where speed control is desired, variable speed motors or Vari-Drive motors may be supplied.

(Jet mixers are product of the Hermas Machine Company, Dept. CP, P. O. Box 166, Hawthorne, New Jersey . . . or check CP 7529 opp. last page.)



BAKER PERKINS INC.

CHEMICAL MACHINERY DIVISION . SAGINAW, MICHIGAN

with the proper feeding and output handling equipment, these Ko-Kneaders make mixing

largely automatic, and result in a better quality product along with savings in production costs.

When inquiring check CP 7528 opposite last page

124

CHEMICAL PROCESSING

Uses: lets up to

Produce

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Features:
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Description three-layer patible matible se

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(Multi-lay

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### Produce 3-layer tablets at rate of 1300/min

Uses: Produces three-layer tablets up to 5%" diameter, with 34" maximum depth of fill.

Features: Machine has capacity of 1300 tablets per minute. Adjustable stainless-steel hoppers are mounted on each of three individual feed frames.

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Description: Press will produce three-layer tablets with three compatible materials or two non-compatible separated by buffer.



Multi-layer tablet press has adjustable stainless hoppers mounted on individual feed-frames

Single compaction operation forms finished tablet which is automatically ejected from press. Unit's operation is reported to open up an entirely new field for production of multiple-layer tablets.

Standard 11/32" or 3/4" fill cams are provided. Oversized tapered roller bearings at top and bottom in die-head mounting resist tablet ejection thrust forces and prolong life of press. Positive oil circulation system is provided for main drive gears.

(Multi-layer rotary tableting press is product of Arthur Colton Co., Div. of Snyder Tool and Engineering Co., Dept. CP, 3400 East Lafayette Ave., Detroit 7, Mich. Check CP 7531 opp. last page.)

For more information on product at right, specify CP 7532
. . . see information request blank opposite last page.



# WHY IS THE PRITCHARD TYPE A HYDRYER THE SOLUTION FOR DRYING GASES?

The Pritchard Type A Hydryer ®—a low-cost, packaged dehydration unit has many outstanding features that pay off in drier gas at lower cost.

100% OF ALL GAS entering the Hydryer is dried without loss.

**BOTH DRYING** and reactivation systems operate at same pressure, eliminating pressuring and de-pressuring of adsorbers between cycles.

**PURGING ELIMINATED.** The Hydryer uses the inlet main gas stream for reactivation, therefore contamination is impossible.

LONGER ADSORBENT LIFE. No movement of adsorbent due to pressure changes or high velocities.

PLUS... Pre-heated reactivation gas... no moving parts... simplified operations... reduced equipment and line sizes... and many other Pritchard Hydryer features.

#### WHO USES A HYDRYER?

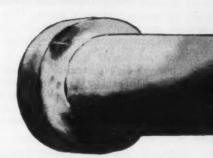
Typical users are E. I. du Pont de Nemours & Co., and Liquid Carbonic Corp. These firms have proved to themselves that the Hydryer is the low-cost answer to moisture problems.

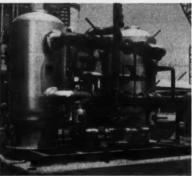
Write for HYDRYER BULLETIN 16.0.081 on your company letterhead.

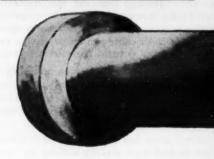
WHEN YOU ARE MAKING AMMONIA the air and synthesis gas streams must be exceptionally dry. Hydryers have proved to be the answer for this vital requirement.

**EXAMPLE:** The Pritchard Hydryer illustrated is on duty at the Cooperative Farm Chemicals Association plant at Lawrence, Kansas. It dries the synthesis gas stream which contains 91% hydrogen and 9% inerts. A continuous flow of 10,000 SCFM enters the Hydryer at 40°F. and 289 psia and is discharged at an exit dew point well below —60°F.

A second Pritchard Hydryer at the same plant dries 15,400 SCFM compressed air, saturated at 40°F. and 500-600 psig, to exit dew points below —60°F.







INDUSTRY'S
PARTNER FOR
PROGRESS

COOLING TOWERS

IN PRINCIPAL CITIES
FROM COAST
TO COAST

J.F. Pritchard & Co.

OF CALIFORNIA

Dept. 441, 4625 Roanoke Parkway, Kansas City 12, Mo.

### Lists six recommended steps for selecting ovens

How to choose proper oven for specific jobs is explained in 16-page catalog. Illustrated with charts, sample calculations, and nomographs, literature discusses energy requirements, investment costs, and various methods of heating. Oven construction, operation, and controls are also reviewed. Six recommended steps for selecting ovens are listed.

"Pan-L-Heat Ovens" is issued by Advance Heating Division, Jensen Specialties, Inc., Dept. CP, 9331 Freeland Avenue, Detroit 28, Michigan. When inquiring reader may simply specify CP 7533 on handy form which is located opposite last page.

# Holding time, film thickness adjustable in centrifugal processing unit . . .

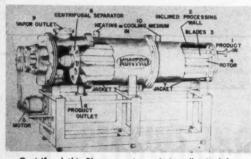
controlled by position of rotor inside horizontal inclined-wall reaction chamber

Uses: Concentrating heat-sensitives, distilling, deodorizing, or other operations involving heating or cooling.

Features: Holding time and film thickness of material being processed in unit can be controlled by adjusting position of rotor. Machine may be operated continuously under either pressure or vacuum conditions.

Description: Centrifugal thin-film processing unit consists essentially of a jacketed horizontal inclined-wall reaction chamber having a whirling bladed rotor inside. Film thickness is dependent upon clearance between blades and heating surface.

As product enters unit at narrower end it is thrown against the heated (or cooled) walls by the rotating blades. Concentrated material passes "down hill", so



Centrifugal thin-film processing unit is well suited for operations involving heating or cooling, especially where products need to be processed fast because of adverse influence of changes in viscosity

# Texas polymerization REACTORS, HEAT METALLURGICAL



THIS installation shows that A. O. Smith service extends far beyond the usual supplying of vessels and exchangers to order. Here, our metallurgical research served to prescribe the chemical specifications used by the customer to improve the corrosion-resistance of specific reactor linings.

A. O. Smith supplied special pressure vessels, as well as five different kinds of heat exchangers for the phosphoric acid polymerization unit.

This typical example shows why the petroleum, petro-chemical and chemical industries bring their pressure vessel and heat exchanger problems to A. O. Smith.

Investigate A. O. Smith's performance in terms of your own processing needs. Write our nearest office. We'll be glad to give you detailed information about A. O. Smith pressure vessels and heat exchangers, engineering and research.

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# serves refineries unit uses EXCHANGERS AND RESEARCH



Three A. O. Smith reactors with type 316 ELC lining are the heart of the unit. Designed for operating pressures of 640 psi, the vessels have 102-in. ID... are 58 ft. long with 23/8 in. wall thickness.

The unit has 21 A. O. Smith heat exchangers. These include reboilers, condensers, coolers, heaters and exchangers, ranging in diameter from 15 to 51-in. We make all types of heat exchangers required by a petroleum refinery.



Broader service through Glascote — For more than 20 years, our subsidiary, Glascote Products, Inc., Cleveland, has been serving the process industries. Glascote Cán supply you with corrosion-resistant laboratory and pilot plant reactors . . . single-shell or jacketed storage tanks . . . double-jacketed condensers . . . columns.



Glascote Products, Inc., Cleveland, Ohio International Division: Milwaukee 1 to speak, towards outlet at wider end. Vapors travel concurrently through a centrifugal separator section, where foam or entrainment is removed before product leaves machine. By moving rotor a bit farther in or out of processing chamber, optimum film thickness and holding time can be obtained.

Units can be constructed of most corrosion-resistant metals as well as mild steel. Capacities range from 40 to 2800 lb per hr (water evaporated at 27" vacuum and 30-psi steam). Overall heat transfer coefficient (U) varies from about 500 to 100 Btu/hr/sq ft/°F (with condensing steam), depending upon material being processed. Largest unit has 80 sq ft heat transfer area and measures 13.8 ft long with 5.3 ft overall diameter.

Special model is available for use with materials to be concentrated to high ratio (excess of 10 to 1) without danger of burning. Unit is same as standard models, except that product moves in opposite direction, "up hill".

(Adjust-O-Film processing unit is product of The Kontro Company, Inc., affiliated with Artesian Metal Products, Inc., Dept. CP, North Main Street, Petersham, Massachusetts . . . or for more information check CP 7535 on handy form opposite last page.)

Are you wondering why many of these editorial articles give . . .

### Manufacturer's Name and Address . . . ?

You doubtless have noted names and addresses of manufacturers at the end of editorial articles in CHEMICAL PROCESSING. Have you wondered, "Is this some sort of advertising?"

It isn't . . . that "source" is there because the editors know that often you want more information, quickly and easily. Of course, such articles are purely editorial material which has been selected by the editors as being worthy of your attention . . . (it is not carried with any responsibility to the manufacturer nor does it obligate the manufacturer). This is strictly a service for you . . . the reader.

We know that many readers often want more than just the pertinent description and facts . . so we tell you where and how you can obtain complete details, either by writing direct or using the handy Reader Service slip.

This is one of our extra Reader Services, pioneered in this field by CHEMICAL PROCESSING in 1938.

THE EDITORS

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METHODS

sometimes fail to meet today's requirements for continuous processing

#### EE LABORATORY TESTING SERVICE SOLVES MANY SIZE REDUCTION PROBLEMS

In the Unit Operation of "Size Reduction" and "Mixing" for doing your jobs more efficiently,

RIETZ DISINTEGRATORS FOR COARSE TO FINE PULVERIZING—SOLIDS OR SLURRIES AND FOR CONTINUOUS MIXING.

RIETZ PREBREAKERS FOR COARSE CRUSHING AND DELUMPING.

We welcome your problems in these important steps of Size Reduction and in Mixing of both solids and liquids.

fications for free laboratory testing, test samples and a full report. Or get in touch with ANY RIETZ OFFICE.

Send sample of your

product with your speci-

You'll never know what Rietz can do for you until you let us try...at our expense.

RETZ MFG. CO. SALES AND SERVICE MIDWEST: 217 West Main Street, St. Charles, Illinois EAST: 1969 Bartle Avenue, Scotch Plains, New Jersey SOUTH: Forsyth Building, Atlanta, Georgia SOUTHWEST: 1213 Capitol Avenue, Houston, Texas



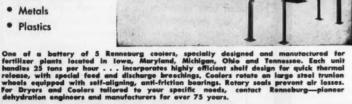
MANUFACTURING CO. Santa Rosa, California

When inquiring check CP 7536 opposite last page

# COOLERS

#### For All Materials

- Chemicals
- Fertilizers
- Food Products
- Metals
- Plastics



#### EDW. RENNEBURG & SONS CO.

BALTIMORE 24, MARYLAND, U.S. A

CONTINUOUS COOKERS, PRESSES, COOLERS, EVAPORATORS . OIL BURNERS . DECOORIZING EQUIPMENT

When inquiring check CP 7537 opposite last page

#### **PROCESSING**

#### Filter needs no filter aid to remove carbon from treated solutions . . .

mobile unit uses Moyno pump and honeycomb filter tubes

Clarifying alkaline plating solutions and other alkaline liquids, coolants, and lubricants.

Features: Removes activated carbon from treated solutions without need of filter aids.

Description: Uses honeycomb filter tubes (Fulflo) that minimize clogging. Small model handles 100 to 150 gal of activated-carbontreated solution between tube changes; larger unit handles from 500 to 1000 gal.

Moyno self-priming pump is assembled with filter to provide compact mobile unit, protected from splashing, and mounted on base with wide swivel-type casters. Pump delivers up to 800 gph against zero-psi back pressure and from 500 to 600 gph against 50psi back pressure. When latter is reached, automatically-operated "blinking light" indicates filter tubes should be changed.

Motor supplied is ½-hp, 115/230 volt, single-phase, 60-cycle capacitor unit, with 10-ft extension cord. Two 10-ft lengths of 3/4" ID chemical-resistant hose are also included.

(Clean-Flo filters are products of The Lea Manufacturing Company, Dept. CP, 16 Cherry Avenue, Waterbury 20, Conn. Check CP 7538 opposite last page.)

#### Flotation machine handles large pulp volumes

Design, dimensions, and specifications of flotation machine are given in four-page bulletin. Designed to handle large volumes of pulp, unit features suspended shaft assembly, which results in maximum efficiency.

Bul F 10-B87 is issued by Denver Equipment Company, Dept. CP, P. O. Box 5268, Denver 17, Colorado. When inquiring specify CP 7539 opp. last page.

# Efficient/Practi

#### EXTRACTION AT LOW COST The York-Scheibel multistage extraction column is ideal for simple countercurrent extraction; and for fractional liquid extraction in which the feed material

cible solvents. Check these features . . .

- . POSITIVE MIXING
- . POSITIVE PHASE SEPARATION

is simultaneously contacted

by two selective and immis-

- . SINGLE, COMPACT COLUMN
- . HIGH THROUGHOUT CAPACITY
- . HIGH EFFICIENCY
- . LOW STAGE HEIGHT
- . LOW COST PER STAGE.



YORK PROCESS EQUIPMENT CORP 4 Central Avenue WEST ORANGE, N. J.

When inquiring check CP 7540 opposite last page



PRESSURE FILTER IS TYPICAL

of the special designs G-B engineers develop to handle particular needs. The filter drum is 6'-0" in diameter by 8'-0" in length, and in this instance maintains a positive pressure of carbon dioxide on the filter cake to prevent the chemical reaction from reversing. Every detail has been worked out to fit the filter to the exact needs, rather than utilizing a "standard" filter and making the process conform to the filter.

G-B Engineers will work with you, too... without obligation!

GOSLIN-BIRMINGHAM MANUFACTURING CO., INC. RMINGHAM . ALABAM



When inquiring check CP 7541 opposite last page

lab dry Uses:

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Corporat check C Flexibility, versatility featured in mobile, full-size lab dryer

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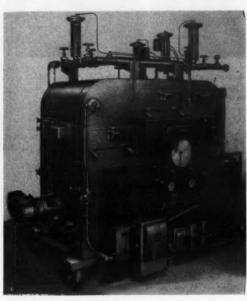
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SING

Designed primarily as research laboratory Uses: dryer for pilot plants, industrial and school labs.

Unit is mounted on heavy-duty ball bearing casters, making it easy to be moved around. Dryer is full-size, self-contained unit, and may be obtained on rental, rental-purchase, or outright pur-

Unit is believed to be first such Description: machine to incorporate features of research dryer with advantage of mobility. Machine is equipped for tray, pole, roll, or plate drying. All gages, valves,



Mobile dryer is full-size unit, can be obtained on rental, rental-purchase, or outright purchase

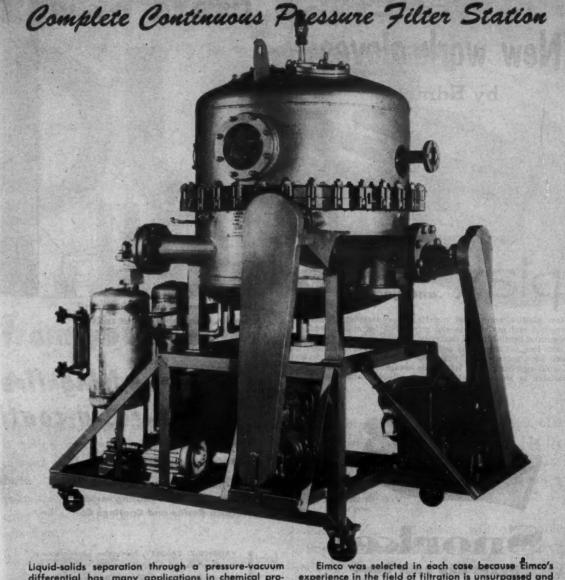
control and recording instruments and charts are mounted on face of dryer. Unit may be operated manually or automatically, or in combination. Each variable, including air velocity, may be changed.

Dryer uses either steam-heated or electrically-heated air. Steam and electrical connections are easily made. Steam source may be any pressure between 40 and 150 pounds. Temperatures up to 300°F can be obtained with steam, 500°F with electricity.

Air consumption of temperature and steam pressure control systems is about 1.2 cfm (free air). Recommended air pressure supply to instruments is 20 psi.

Overall dimensions of machine are 8' 6" high x 8' wide x 6'7" deep. Dryer is also valuable for production work-particularly where quick adaptability to variables in materials or methods is required.

(Mobile dryers are product of C. G. Sargent's Sons Corporation, Dept. CP, Graniteville, Mass. . . . or check CP 7542 opposite last page.)



differential has many applications in chemical pro-

Eimco designed, tested and approved pressure vessels of this type have found wide acceptance in many different kinds of jobs. Some of these use heat and others use inert gas. Some of the jobs involved combustible materials and others non-combustibles.

All of the installations are classified as far as Eimco is concerned to protect the customer's process or his idea and his flow sheet.

experience in the field of filtration is unsurpassed and Eimco's ability to engineer into each filter that extra quality that provides for greater product recovery and greater profits for the user.

Let Eimco's Research and Development Center. tackle your filtration problem. You will have the benefit of work by some of the best technologists in the industry, plus complete pilot plant data. Elmco backs the recommendations of its Research Center by a guaranteed performance.

#### CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City















When inquiring check CP 7543 opposite last page

# New work gloves

by Edmont



# plax replaces canvas

New plastic-impregnated material gives complete finger freedom and perfect non-slip grip. Ideal for applications requiring flexibility and dexterity. Outwears canvas 4 to 1. Costs less, yet frequently outwears goatskin, has no offensive odor, no thick-and-thin spots and does not get slick. Liquid-repellent, yet it lets hands breathe. Cool and comfortable to wear. Can be washed without shrinking.

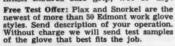


# Snorkel

flexes like your hand

Super-flexible • Perfect fitting Seamless palm • Grips wet or dry

Comfort and ease of work handling never before available in a long-wearing work glove. New 2-piece pattern, with curved, preflexed fingers and wing thumb, fits the entire hand perfectly, has no seams where they can rub or wear. Jersey liner increases flexibility. Special vinyl coating gives excellent resistance to abrasion, is grease and liquid-proof. Non-slip finish insures safe grip, wet or dry.



Edmont Manufacturing Company 1204 Walnut Street, Coshocton, Ohio



No. 40 SNORKEL, pulm coated knitwrist



No. 412 SNORKEL, fully coated 12-inch gauntlet

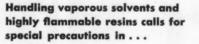


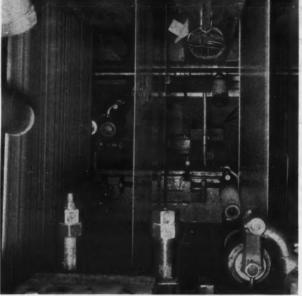
Edmont job-fitted gloves

When inquiring check CP 7544 opposite last page

#### safety







One of the controls (arrow) which sets off 16 CO<sub>2</sub> nozzles onto coating pans and fabric whenever there is a sudden surge in temperature. One nozzle is seen just below control

# preventing fire and explosions in resin-coating operations

Two-phase anti-fire system protects drying and impregnating tower at Narmco Resins and Coatings Co.

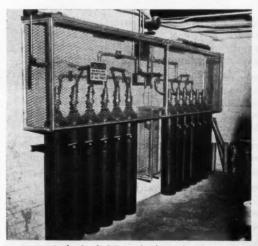
VAUGHN E. BRADLEY, Production Superintendent and Chairman of Safety Committee Narmco Resins and Coatings Company Costa Mesa, California with RICHARD J. CALLAHAN, Assistant Editor

Problem: Vaporous solvents and highly flammable resins present a formidable fire prevention and control problem to the Narmco Resins and Coating Co., of Costa Mesa, Calif., a subsidiary of Narmco of San Diego.

They have to face both these hazards in operation of their drying and impregnating tower, where fabric is resin-coated and dried in a continuous five-pass operation (see story, page 22).

Any kind of static spark threatens an oven explosion if the vapors become too heavily concentrated. This in turn is likely to ignite fabric which, if uncontrolled, would produce a steady fall of hot embers into resinous coating pans at the bottom of tower. Thus a fire, once started, is exceedingly difficult to extinguish because fabric embers continually fall into and reflash coating pans.

Solution: Despite these hazards, Narmco's extensive fire prevention and control facilities have



Automatic bank of CO<sub>2</sub> tanks, located just outside coating room, is connected to tower nozzles. It is periodically inspected for efficiency

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avoided fires in the new impregnating tower. Their two-phase anti-fire system includes both prevention and control equipment.

For explosion prevention, a Mine Safety Appliances Company gas analyzing meter has been installed in the tower control room. Here a continuous check against the lower explosion limits of the solvent vapors at four specific points in the tower oven are recorded and shown on an indicator. In addition, an automatic siren on meter sounds warning when critical level is reached.

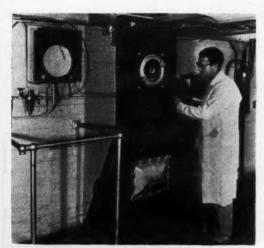
If — despite these precautions — a fire should be ignited in the tower, additional controls, actuated by any sudden surge in temperature, immediately set off a series of 16 nozzles that are fed from an automatic bank of CO<sub>2</sub> tanks. These nozzles are spotted to direct a cloud of CO<sub>2</sub> on the coating pans as well as on the fabric throughout the 30-foot-high oven. The CO<sub>2</sub> tanks operate automatically for 30 seconds, and may, if necessary, be reactivated for subsequent 30-second periods by a manual trigger located outside the coating room.

The CO<sub>2</sub> equipment has four specific advantages:

1) it extinguishes the fire by smothering, 2) it simultaneously cools surrounding metal surfaces, thereby minimizing the danger of reflashing, 3) it extinguishes any falling embers in the oven, and 4) it leaves no residue, thus simplifying cleanup after a fire.

Results: In addition to performing its basic fire prevention and control functions ideally, the new equipment has also materially increased the efficiency of the impregnating tower. Previously, it was necessary to calculate theoretically the amount of vaporous solvents, in terms of pounds per minute, that the tower exhaust system could safely extract. These calculations necessarily were highly

(Continued on next page)



Volatile analyzer determines amount of volatile or explosive atmosphere present inside coater

# How to erase



# from your CHEMICAL PLANT AT LOW COST!

Whatever your dust problem, you can solve it at low cost with a Johnson-March engineered dust control system. Experience in both liquid and dry systems enables Johnson-March engineers to specify whichever type will solve your problem most effectively.

Your application may call for an economical liquid system for stopping dust right at its source in the handling of bulk materials. These engineered systems cost only 1/10 that of most dust handling systems.

If you are interested in dry collection of dust or recovery of valuable materials, J-M Dual-Clone Dust Collectors or Reverse Air Jet Filters offer high collection efficiencies and substantial savings.

Johnson-March engineers will, at no obligation, gladly analyze your dust conditions and show you how easily and economically you can eliminate your dust nuisance and hazard. Mail the coupon today for results that pay.

THE JOHNSON-MARCH CORP.	CP
1724 Chestnut St., Philadelphia 3, Pa.	
At no obligation, please	
Send informative data on J-M dust cont	trol systems.
☐ Have an engineer analyze our dust	problem.
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COMPANY	
ADDRESS	
CITYSTATE	

# Johnson March

Dust Control Engineers
1724 CHESTNUT STREET, PHILADELPHIA 3, PA.

CANADIAN REPRESENTATIVES: G. F. Sterne & Sons, Ltd., Brantford, Ontario

When inquiring check CP 7545 opposite last page



# HAWS EYE-WASH FOUNTAINS

Time elapsing between the accident and arrival of medical aid, is too often a cause of permanent eye injury. Bridge this time gap with a HAWS Emergency Eye-Wash Fountain. Installed at convenient locations, these HAWS safety devices are instantaneously ready when such accidents occur.

The HAWS Eye-Wash Fountain washes injurious chemicals out of the eyes with clean water at controlled pressure and volume. It is also available with Drench Shower Attachment...completing an emergency station for your employees' protection.



Designed and manufactured in cooperation with leading safety engineers

WRITE TODAY for brochure and full details



#### DRINKING FAUCET CO.

1439 FOURTH STREET (Since 1909) BERKELEY 10, CALIF.

When inquiring check CP 7546 opposite last page



# **Safely Ventilate**

# MOISTURE and FUMES

Three outstanding features make Air-Van (R) Power Exhausters especially suited to situations where moisture and fumes are present.

- The motor is out of the air stream.
- A positive air seal-off creates a constant curtain of fresh clean air around the motor shaft. This absolutely prevents fumes from entering the motor housing.



5,000-65,000 CFM. S.P. to 4".

Patents 2188741 — 2526290 Patents pending Patented scroll effect design assures positive air removal. Research has shown that without scroll effect, efficiency beyond ¼" S.P. is impossible.



Direct Drive 0-11,000 CFM.

Other Gallaher features include low silhouette, weatherproof design, low noise levels, and availability in special metals and finishes.

#### The GALLAHER Company

Pioneers in Research-Designed Power Roof Exhausters
4108 Dodge St. Omaha, Nebraska

When inquiring check CP 7547 opposite last page

#### SAFETY

#### FIRE PREVENTION

(Continued from preceding page)

conservative. With the gas analyzing meter such determinations are no longer required. In many cases it is thus possible to increase the speed of fabric runs by as much as 10 to 15 per cent without approaching the lower explosion limit. Needless to add, the addition of the modern fire prevention and control equipment has substantially reduced Narmco's fire insurance rates, which before were very nearly prohibitive in an unincorporated area served only by a volunteer fire department.

(CO<sub>2</sub> system was provided by Pyrene C-O-Two, Dept. CP, P. O. Box 390, Newark 1, N.J. . . or for more information check CP 7548 on handy form opposite last page.)

3000 pounds of cork dust per day minimized as explosion hazard by plant clean-up system . . .

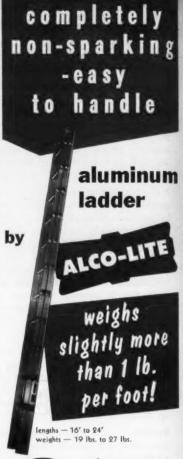
central vacuum cleaning system catches dust that escapes collectors

Cork dust is a combustible substance — presenting an explosion hazard nearly equivalent to that of corn starch. Controlling this dust is a major safety problem in plants processing large amounts of cork. At the Wilmington, Delaware plant of Bond Crown & Cork Co., a division of Continental Can Co., approximately 50 tons of cork are used daily for bottle cap liners.

In the process of making these liners a considerable amount of cork dust is produced. Each processing machine is vented into dust collectors and nearly 3000 lb of cork dust is collected per 24 hour period.



Clean-up operation around vibratory separator. Plugin connection to the vacuum line is shown at lower left





RUNGS WON'T TWIST, TURN OF BREAK OFF.

Corrugated 1" tubular aluminum rungs are permanently attached to the side rails with exclusive ALCO-LITE gusset plate and expansion bushing construction.

#### Won't rust, rot, burn, or splinterl

The DLL Extension Ladder is the lightest—easiest to use ALCO-LITE extension ladder made. Because it is non-sparking it is completely eafe around inflammable material. It easily supports a 500 lb. load and more than meets the rigid code and tests of the ASA and Metal Ladders Association. Lasts for years with almost no maintenance. WRITE FOR DETAILS!

Dept. A	NUM LADDER COMPANY	4"
Please	send me further details abo and other ALCO-LITE Alumin	out the DLL Ex- um Ladders.
NAME_		
COMPA	4141	
ADDRES		

When inquiring check CP 7549 opposite last page

CHEMICAL PROCESSING

Efficient cope with erated in fines han eaves, but To keep Bond has program

Motor sembly

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Shows of

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Efficient as these collectors are, they cannot fully cope with the large amounts of very fine dust generated in grinding and screening operations. These fines hang in the air and eventually settle on floors, eaves, building trusses, etc.

To keep dust concentration down to a safe level, Bond has instituted a rigidly scheduled housekeeping program to supplement work of the dust collectors.



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DLL Ex-

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Motor and exhauster assembly create vacuum for cleaning system

One of the main features of this program is use of an industrial central vacuum cleaning system. This system consists of a motor-driven exhauster, a circuit of metal piping throughout plant, and a set of separators where dust is collected.

Plug-in terminals at various locations allow flexible hoses and brushes to be kept to an easily-handled length. Worker merely plugs in his hose to an inlet, vacuums that location, disconnects his hose and moves on to next area.

Plant clean-up takes place on Monday mornings. This is done to allow dust to settle over the week end. Minor clean-up routines are followed daily.

(Exidust system used in plant was developed by the Lamson Corp., Dept. CP, 303 Lamson St., Syracuse 1, N.Y. . . . or for more information check CP 7550 on handy form which is located opposite last page.)

### Shows complete line of motors

Folder of four pages shows complete line of explosion-proof motors. Construction features are described in detail. Cutaway views of typical motors are shown. Motors run from 1/20th to 2500 hp.

Chemical motors booklet is available from Marathon Electric Manufacturing Corporation, Dept. CP, Wausau, Wis. When inquiring specify CP 7551 on handy form which is located opposite last page.

Find thermal conductivity of common heat exchange media with nomograph, page 200

# For better protection in the chemical processing industries

# JAXCOLITE!

We don't imagine there has ever been a safety apparel material devised that is SO RIGHT for all the job risks in chemical processing as Jaxcolite-coated asbestos, duck or burlap.

Jaxcolite is a new compound. It has been thoroughly tested, proved and approved. Applied to the materials mentioned above, it provides exceptional resistance to the strongest acids and caustics, to heat, to burn, to molten metal splash, and of course to oil and water. Yet it wears well, is flexible, lightweight and comfortable. Its cost is low. And the amazing thing is that people who have used it refuse to buy anything else.

Steel-Grip makes a complete line of safety apparel made from Jaxcolite materials. The list is shown on this page. We earnestly urge you to send for trial swatches of this material and make any tests you want. It may prove to be *THE* answer to safety problems long unsolved. Send today.

\*A product of Jaxind, Inc.





# Steel-Grip JAXCOLITE Safety Garments

This new, better material is available in:

Coats Leggings
Pants Spats
Sleeves Gloves and Mitts
Aprons with Jaxcolite backs
Safety Curtains

We make safety apparel for every need... in Dynel cloth, aluminumcoated materials, Certified Ashestos, leather, wool, Perma-Proof materials, duck, etc. Write for catalog—today.

When inquiring check CP 7552 opposite last page

#### Protects oil extraction plant which uses hexane as solvent

fog system guards against fire in soybean oil extraction operation

At Swift and Company plant, Fostoria, Ohio, oil is extracted from soybeans. They use the Rotocel unit which permits continuous extraction of the oil. While this method of extraction using solvent is an improvement over mechanical extraction, a new problem inherent in the system had to be solved. Hexane, which has been used almost exclusively as solvent in soybean extraction units, such as basket type and the improved continuous Rotocel, has some of the same fire-hazard characteristics as gasoline.



Rotocel unit at Swift & Co. plant at Fostoria, Ohio for extracting oil from soybeans. Hexane used in process is checked as safety hazard by fog system set up for this process

It has a flash point of minus 15°F and its explosive range is from 1.2 to 6.9 per cent. It does not heat spontaneously, has a boiling point of 156°F and its vapor density is 2.97, or practically three times as heavy as air. Such heavy vapors have a tendency to creep along plant floors, collecting nonturbulent areas, thus creating fire hazards.

Should a solvent fire start, it is not desirable to snuff it immediately since the heavy vapors would tend to concentrate, drift to other areas, and create explosion hazards.

To protect the Swift & Company investment and production capacity in case of fire, Blaw-Knox was contracted to design a fog system. In case of fire, system would protect structure and process equipment against serious flame damage by keeping equipment and building members cooled with a heavy spray using minimum amount of water. At the same time, free vapors would be exhausted by the fire.



# NOW. .. CONSOLIDATED SAFETY RELIEF VALVES

in economical "2 in 1"



Peak performance . . . positive valve action assured . . . even where discharge lines are long, or low "superimposed" back pressure exists in the relieving system.

"Two-In-One" design, improved performance...the new Consolidated Safety Relief Valve is the result of over 4,000 flow tests in 5 years at West Edmond, Oklahoma. At the A.S.M.E.-approved testing station there, natural gas is available in flow capacities up to 35,000 cfm and pressures up to 500 psig. The A.S.M.E.-approved conditions, apparatus, and procedures, permitted Consolidated engineers to test-develop and prove the full range of valve sizes and pressures in both Standard and Bellows designs.

Interchangeability is so highly developed that the majority of Consolidated Standard Valves can be converted to the Bellows design, in the field, simply by installing the bellows. Each type has fewer functional parts than other comparable safety relief valves. Standardization of inlet and outlet center-to-face dimensions permits interchangeability with a large proportion of the valves of other manufacturers. Incorporated is an optically-ground flat seating surface that contributes to easier, more economical maintenance.

You can have the absolute protection and real economy of the thoroughly tried and proved Consolidated Safety Relief Valves for your plant today. Both Standard and Bellows types are available in sizes and pressures to meet requirements of the most advanced processing facilities. Write for full details. Ask for Catalog 1900.

CONSOLIDATED SAFETY

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sure and b sistent. The full capaci sure regard of the adju

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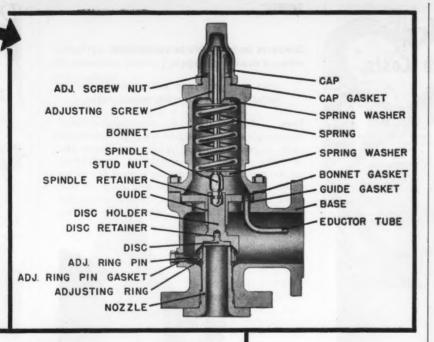
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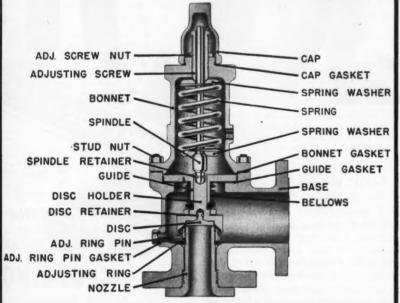




JUNE. 19

STANDARD VALVE has an eductor tube that holds the pressure in the valve bonnet to approximately atmospheric pressure; thus only the force of the spring controls the valve. Valve action is improved and stabilized . . . repetitive flow capacity is provided . . . a new high in operational dependability is assured. Even under repeated popping of the valve, set pressure and blowdown are consistent. The valve will open to full capacity at 3% overpressure regardless of the position of the adjusting ring.





BELLOWS VALVE is like the Standard but has a durable, two-ply stainless steel sealing sure-relieving systems.

bellows which effectively isolates from the valve's working parts any contaminants, corrosion, or viscous fluids. The bellows is balanced with the seating surface: set pressure of the valve is not affected by back pressure. whether constant or variable. Consequently, smaller discharge piping can be used, thus reducing the cost of pres-

Water is supplied to the fog system by a fire pump, which along with jockey pump and controls is lo-cated in a detached building. Water supply for the fire pump is a reservoir which contains a 60 minute supply. Jockey pump maintains a pressure of about 60 psi in the fire lines. When deluge valves on fog system open, pressure in fire lines drops, and at 40 psi pump starts up automatically.

Water is piped into protected building through a 10inch main which splits into two 6-inch lines, one for each system.

Fog apparatus consists of two deluge systems, using a total of 154 nozzles, which shower some 2200 gallons of water per minute, with a pressure of 87 pounds at the fire pump.

Systems are released by any of 19 rate-of-rise, heat actuated devices located strategically throughout building. These detect any rise in the temperature of surrounding air, and operate the system when the temperature increases at a rate of 15 to 20 degrees per minute or more. This causes deluge valves to open and fog to envelop equipment and interior of the structure. System can also be triggered manually by tripping the pull handle at the deluge valves or the pull box handle located outside the building.

All power and steam to the Extraction Building are cut off automatically when the fog system operates. This is done to minimize the flow of escaping solvent or vapor.

Fog system controls are automatically supervised. If shut-off valves ahead of the deluge valves are closed, an alarm sounds. Air pressure in H.A.D. system is maintained automatically. However, if pressure should drop below normal, a visual as well as an audible alarm is given.

(Fog system is a product of the Automatic Sprinkler Div., Blaw-Knox Co., Dept. CP, Farmers Bank Bldg., Pittsburgh, Pa. . . . or for more information concerning manufacturer's product, reader may simply check CP 7554 on convenient Reader Service slip which is located opposite last page.)



#### Certified and Approved

Both Standard and Bellows Valves are approved under A.P.I.-A.S.M.E. Unfired Pressure Vessel Codes, A.S.M.E. Unfired Pressure Vessel Code and are certified by the National Board of Boiler and Pressure Vessel Inspectors.

#### A PRODUCT OF MANNING, MAXWELL & MOORE, INC.

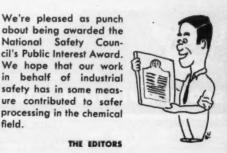
TULSA, OKLAHOMA



MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. AIRCRAFT CONTROL PRODUCTS, Danbury & Stratford, Conn. and Inglewood, Calif. "SHAW BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.

THE EDITORS

field.



When inquiring check CP 7553 opposite last page



SCOTT AVIATION CORP.

Canada: Safety Supply Co., Toronto — Branches in principal cities

Export: Southern Oxygen Co., 15 West 57th Street, New York 19, N. Y.

When inquiring check CP 7555 opposite last page

LANCASTER, N. Y.

SAFETY

Converts instruments to controllers without drastic changes . . .

> picks up signal from instrument pointer initiates action at predetermined value

Uses: For installation on switchboard or panel instruments to initiate action when predetermined value is reached. Some typical applications are: sounding alarm when controlled temperature reaches critical value; initiating control to contain cycles per second within a specified range; to shut down equipment at maximum vibration point; and to shut down machinery drawing more than normal power.



Simple device converts existing instruments to control units. It initiates action when a predetermined value is reached. System electrically picks up signals of instrument pointer and initiates action

Control instrument is suitable for one set-point or two set-point initiation.

Description: Automatic, all electrical device, electrically picks up signal from instrument pointer and initiates action. Load relay supplied is rated at 120/240 volts, 10/5 amp, single pole double throw. Manufacturer of unit has announced that its service shops, which normally repair electric instruments, can modify customers' switchboard instruments to incorporate the standard control initiation feature without affecting their accuracy.

(Control initiator is a product of the Instrument Dept., General Electric Company, Dept. CP, Schenectady 5, N. Y. Check CP 7556 opp. last page.)

Have a safety problem . . .?

the handy Product Directory (pages 214 to 217 in this issue) is your guide to equipment and ideas which may suit your needs.

Designed for PROTECTION



#### can take it!

Tough - wears like iron, takes endless snagging, scraping, chafing and still gives full protection.

Rotproof — not affected by oils or chemicals — will not blister, crack or peel.

Waterproof — made with top quality base fabric, first saturation-coated, then coated on the inside as well as on the outside with specially blended Neoprene Latex.

Many styles — in black, yellow or Hunter's green Write for catalog

THE H. M. SAWYER & SON CO. Cambridge, Mass.

When inquiring check CP 7557 opposite last page

CHEMICAL PROCESSING

Safe Figl

FIRE PREV

Space-saving S Con. Oval she imum number minimum space by handle is in for pouring. S struction; dou in spout; self-ball and soc vapors and r relief. Also si

Safety Transfe Three perforat fire baffles safety from b suction tube t discharge noz Static-proof h

Protecteseal designment of the Prevention of the Check coupon

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Send without ob checked. □ Laboratory Sc

Hazardous Liq of more than 3

Company.

When inc

JUNE, 19

242 ERIE STREET

# Safety Fights Corrosion with PROTECTOSEAL

FIRE PREVENTIVE EQUIPMENT

Space-saving Stainless Steel Shelf Cas. Oval shape permits maximum number of containers in minimum space; when grasped by handle is in correct position for pouring. Seam-welded construction; double-wall fire baffle in spout; self-closing cap with ball and socket seals liquid vapors and provides pressure relief. Also supplied in terne plate. 1-gallon capacity.



Ó

Stainless Steel Wide-Meuth Disposal Can. Large 3½ opening may be locked in open position; seam-welded body with perforated metal fire baffle. Leak-proof spring-loaded cap prevents evaporation and provides pressure relief. Also available in terne plate. Sizes: 2-gals. and 5-gals.

Safety Transfer Pump.
Three perforated metal
fire baffles provide
safety from bottom of
suction tube to top of
discharge nozzle.
Static-proof hose.
Steady even flow;
fast shutoff.





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7557

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Safety Storage Cabinet permits storage of 45-gallons of hazardous liquids in any department in approved fire preventive containers of not more than 5 gallons. Complies with specifications of NFPA.

Protectoscal designs and builds All Types of Approved Fire Preventive Equipment for the Storage, Transfer and Plant use of all Flammable Liquids. Check coupon and attach to company letterhead. In Canada, Safety Supply Co., Canada

The Protectoseal Company 1932 So. Western Avenue, Chicago 8, Illinois Send without obligation the descriptive literature checked.

☐ Laboratory Safety Equipment Catalog Sheet☐ Hazardous Liquid Equipment Chart and Price List of mare than 30 Approved Fire Protective Devices

Name Title
Company
Address
City Zone State

When inquiring check CP 7558 opposite last page

Complete lighting system developed for locations where  $C_2H_2$  or  $H_2$  are present . . .

explosion-proof system is approved for Class 1, Groups A and B hazardous areas

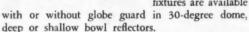
Uses: To provide lighting system for hazardous areas (Class I, Groups A and B) where acteylene and hydrogen are present.

#### Features:

Housing of lighting fixture is of one piece, combining both body and hood, to provide extra strength without unnecessary bulk. Notches in hood and globe allow globe and holder assembly to be loosened with screw driver for relamping. For wiring, receptacle and mounting plate assembly are easily removed by loosening self-retained screws.



System consists of 150 and 200 watt pendant lighting fixtures, junction boxes, tumbler switches, seals, unions, and flexible couplings and flexible fixture hanger supports. Pendent lighting fixtures are available



switch and junc-

tion box

(System is a development of Crouse-Hinds Co., Dept. CP, Wolf & Seventh North Sts., Syracuse, N.Y. . . . or check CP 7559 opposite last page.)

# Describes shatter-proof control hood

Tumbler

Lighting fixture

Folder of six pages describes transparent control hood with atmosphere controls. Details of construction features, dimensions and dust filtration of unit are also described.

Catalog 9805 is available from The Emil Greiner Co., Dept. CP, 20-26 N. Moore St., New York 13, N. Y. Specify CP 7560 opposite last page.



When inquiring check CP 7561 opposite last page



# FERRO FLITER

#### **Magnetic Separators**

are used by Stupakoff Ceramic & Manufacturing Company to remove iron particles from talc and clay used in the manufacture of electronic parts. The company takes this important step to guard the high quality and uniformity of their ceramics in critical applications.

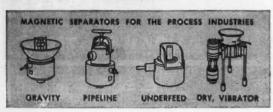
Here, a 68V FERROFILTER has been mounted on rails to permit discharge of clean material to selected locations. Frantz Dry FERROFILTERS are also offered for suspended mounting. Available in two sizes with capacities from 1 to 25 tons per hour. Fully enclosed eccentric weight vibrator speeds flow of material.

#### Send for Bulletin 56-E

Shows complete line including Gravity, Pipeline and Underfeed models for liquids and slurries. Tables of sizes and capacities help you select the right one for your job.

#### S. G. FRANTZ CO., Inc.

Brunswick Pike & Kline Ave.
P. O. Box 1138 Trenton 6, N. J.



When inquiring check CP 7562 opposite last page

#### SAFETY

### Eliminates broken bottles as safety hazard

Bottle crusher is designed to eliminate broken bottle hazard in bottling plants. Machine grinds bottles down to a size of less than 1/10th that of the original intact bottle. Crusher handles bottles in practically all sizes and is motorized



Crushes broken bottles at 400 per minute rate

for continuous high-speed operation. Quart bottles are handled at the rate of 120-150 per minute; 12-ounce bottles at 360 per minute; 6, 8, 10-ounce bottles at 360-400 per minute.

Crusher comes complete with electric motor. Construction of frame is all steel. Crushing wheels are of cast iron

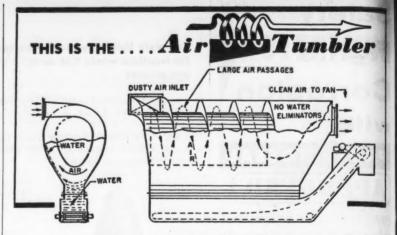
(Bottle crusher is a product of the Specialty Engineering Company, Dept. CP, Torresdale Ave. & Pennypack St., Philadelphia 36, Pa. . . . or for more information check CP 7563 on handy form opposite last page.)

### Unit helps control air pollution . . .

activates equipment only objectionable situation

Uses: To activate air pollution control instruments.

Features: Unit will activate instruments only when wind speed and direction result in an objectionable pollution situation.



the master of DUST in industry

SIMPLE—DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST

Write for Bulletin No. 531. Address:

#### DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U.S. cities

When inquiring check CP 7564 opposite last page



When inquiring check CP 7565 opposite last page

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When inquiring check CP 7566 opposite last page



- . NO FRAGMENTATION . . . Disc ruptures in several similar lobes. Gives unrestricted
- opening.

  HIGH SPEED PROTEC-TION . . . Sure-fire opening makes FDI discs desirable on all systems, hydraulic or
- VERSATILITY . . . Use them anywhere in your
- piping system.
  WIDE PROTECTION RANGE . . . Designed to rupture from 5 psi to 5,000 psi . higher on special

The Engineered "Safety Factor"

Pressure system protection is no problem with frangible discs. You decide your own replacement schedule . slide the re-

tainer ring out, replace the disc and re-install. As simple as that.

Send For Our Free Catalog Today



rangible Discs. Inc.

When inquiring check CP 7567 opposite last page

Description: Unit is similar to a windvane equipped with a propeller. Wind speed is measured by rotation of propeller coupled to magnet. Drag of magnet on calibrated, spring-restrained cup gives speed.

Commutator and brush serve to measure angular displacement equivalent to selected speeds.

At selected directions and speeds circuit through transmitter is closed, thus energizing time delay relay through sensitive relay.

(Windtrol unit is a product of Bendix Aviation Corp., Dept. CP, 1350 Taylor Ave., Baltimore 4, Md. . . . or for more information check CP 7568 opposite last page.)

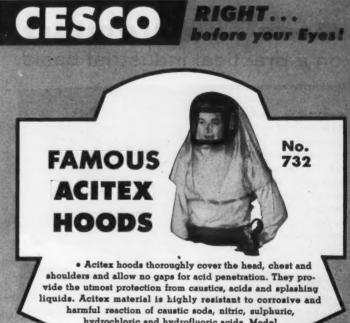
#### Issues data sheet on methylamines

Safety data sheet of 20 pages covers properties and essential information for safe handling and use of methylamines. Waste disposal, first aid treatments, toxicity, and storage problems are included.

Data Sheet SD-57 is available by remitting 25c to Manufacturing Chemists' Association, Inc., Dept. CP, 1625 Eye St. N. W. Washington 6, D. C.



Cartoon above is reproduction of National Safety Council poster 0432-A. For information write National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago II, III.



hydrochloric and hydrofluoric acids. Model shown is fresh air supplied for use in extremely hazardous fume conditions.

No.748



#### **Snap-Fast Face Shield** with Deflector Crown

· Here's a CESCO face shield that offers greater protection with more comfort. Tough, plastic windows, extending well beyond the ears, protect face and neck. Clear Vinyl windows are recommended where splashing acid is involved. Fiber deflector half crown protects fore part of head. Crown and window tilt as a unit.

#### No. 99 Approved **CESCO** Respirator

• A twin cartridge organic vapor respirator (BM Approved) with positive acting inhale-exhale check valves which prevent rebreathing. Easy to install new cartridges. Converts to No. 96 (BM Approved) CESCO Dust Respirator by changing cartridges to filter pads. Buy one respirator with cartridges and filters for dual service.



CHICAGO EYE SHIELD COMPANY • 2316 Warren Boulevard, Chicago 12, Illinois



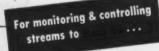
#### FOR SAFETY

s City, Knoxville, Little Rock, Los Angeles, Lauisville, Mexico City D.F., Milwaykee, A orgh, Salt Lake City, San Francisco, Spokane, St. Lauis, St. Paul, Toledo, Tuha,

When inquiring check CP 7570 opposite last page

# Mass spectrometry on a practical industrial basis

Two companion instruments, Types 21-610 and 21-620, now extend the speed and accuracy of mass spectrometric analysis from the laboratory out into the plant. Flexible and simplified, needing only 115 volts and a small supply of cooling water, the twin instruments are easily adaptable to process-stream monitoring, batch work, or leak detection.



TYPE 21-610 is moderately priced and a truly general-purpose instrument. Although primarily designed for continuous petroleum and petrochemical stream analysis, it is also valuable as a production-line leak detector or laboratory analytical instrument. It has been used in applications ranging from on-the-spot acetylene-plant monitoring to hospital clinical tests on lungs.



For higher resolving power, readings to

TYPE 21-620 has the highest mass range of any instrument in its compact size range. Using the newly developed "Cycloidal Focusing" principle for analysis, it goes beyond the 21-610 for accurate readings from mass 2 to mass 150. Medical laboratories, petro-chemical plants and general research organizations will all find it an ideal answer to their analytical problems.

#### Modifications...accessories



The 21-610 may be converted to a 21-620 whenever the latter's greater resolving power is needed. The work is accomplished by a CEC Field Service Engineer without return of the instrument to the factory. Involving primarily the exchange of some components and the addition of certain others, the conversion is made reasonably and quickly.

An extensive accessory line greatly broadens the utility of both the 21-610 and 21-620. Automatic peak selectors scan as many as six mass numbers on a repetitive cycle; sampling probes and magnet shunts make either instrument a practical production-line leak detector; batch-sample inlet systems and continuous-chart recorders (left) may be mounted directly on the instruments.

How industrial mass spectrometry can be used in *your* business is explained in Bulletin CEC 1824A-X18. Send for your copy.

#### Consolidated Engineering

Corporation

ELECTRONIC INSTRUMENTS FOR MEASUREMENT AND CONTROL
300 North Sierra Madre Villa, Pasadena 15, California

Sales and Service Offices Located in: Albuquerque, Atlanta, Buffalo, Chicago, Dallas, Detroit, New York, Pasadena, Philadelphia, Seattle, Washington, D. C.

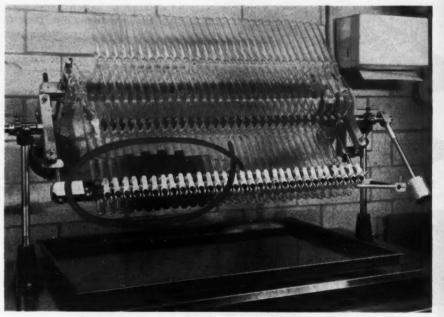
When inquiring check CP 7571 opposite last page

#### for the laboratory

Even slightest traces of impurities show up when photographic chemicals are put to work. Kodak chemists have found that it's easier to . . .

# separate components

# -THEN Analyze



Separation in progress is shown by dark material indicated in tubes

PROBLEM: A section of a report by a chemist at Eastman Kodak in Rochester reads: "Small amounts of impurities in photographic chemicals can have objectionable photographic effects. Because of the complexity of some of the molecules involved, it is not practical to analyze for small amounts of impurities in the presence of the main ingredient with the desired degree of accuracy."

One of the specific problems facing this chemist was assaying 2,6-dibromo-1,5-dihydroxynaphthalene. Made by brominating dihydroxynaphthalene, this reagent was usually contaminated with small amounts of mono- tri-, and even tetrabromo materials. Complicated reagent analyses were needed to get production conditions lined up to

produce the purest form possible.

Solution: Since these chemicals were so similar (in everything except the result they produced photographically) it was decided to separate them from one another before analyzing. Separation had to be quantitative, introduce no additional impurities. Since countercurrent extraction with proper solvents is capable of doing this, such apparatus was installed.

This extraction unit has 30 specially shaped glass cells. These are joined glass-to-glass in such a way that decantation of lighter solvent of a two phase system is made automatically in each cell by tilting. Two immiscible solvents are used. Sample

Two immiscible solvents are used. Sample is dissolved in one of these — say the lower phase. This is placed in one or more

cells of capacity solvent is rocks bac contact. similar to first cell,

drawn as these fra bility in To stand terials as are run added in analysis.

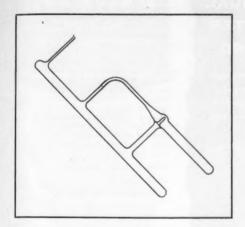
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Results: simple a degree of otherwise place conmethods this equi Further of "Requisite countercus synthetic material a production naphthale ditions. A

the amounthe data is be change material."
(Extracto

Instrumer N.Y. . . on handy



cells of the extractor. All other cells are filled to capacity with the heavier solvent, too. Then a lighter solvent is introduced at the first cell. As extractor rocks back and forth, phases are brought into intimate contact. Light phase is decanted to second cell for similar treatment, more light solvent is introduced at first cell, and procedure is repeated.

By the time that light solvent phase has reached the exit of this train, the components of the original sample have been separated into fractions in one or more cells. These fractions can be withdrawn and analyzed separately. Position of any of these fractions is a function of the relative solubility in the two solvents employed.

To standardize the method, samples of pure materials are deliberately contaminated before they are run through the extractor. Recovery of the added impurity is used as a check on validity of analysis.

Results: While this method of extraction is not a simple affair, it makes analysis possible with a degree of accuracy which would be impossible otherwise. And with this method it is possible to place confidence limits on simpler (and cruder) methods of analysis. Laboratory management likes this equipment very much.

Further quoting from the report mentioned above: "Requisite conditions were determined for a countercurrent distribution that would separate a synthetic mixture of the unbrominated starting material and each of the brominated analogs. The production grade samples of dibromodihydroxynaphthalene are distributed under established conditions. Any impurities present are uncovered and the amount of the impurity determined. Should the data so indicate, manufacturing conditions can be changed to ensure the purity of the dibromo

(Extractor is a product of H. O. Post Scientific Instrument Co., 6957 63rd Ave., Middle Village, N.Y. . . . or for more information check CP 7572 on handy form opposite last page.)

# here's the story of the

# New Glas-Col "R" 650° C Heating Mantle

- .. made with a newly developed, extra tough fabric
- . . designed for pilot and production plant applications

If you have a pilot or production plant application which requires controlled heating to 650° C, you'll be interested in the new Glas-Col "R" Electric Heating Mantle. The newly developed fabric used in type "R" mantles is extremely rugged, mechanically, and readily withstands heavy and punishing usage. The break-resisting and wear-resisting qualities of Glas-Col "R" mantles make them especially suitable for large kettles or receptacles used in pilot plants and production plants. Fabric breakage, which sometimes occurs with conventional 650° C quartz mantles, is almost eliminated.



A separate mantle provides heat for the top half of the kettle when high boiling liquids such as oils, plasticizers, etc., are being heated.





For additional information, contact Glas-Col Apparatus Company, Dept. CP, 711 Hulman Street, Terre Haute, Indiana

This is a new Glas-Col "R" 650° C Heating Mantle. It was designed and built for the 35-gallon stainless steel kettle shown. Power imput into the bottom portion of the mantle is 10 KW, at 220 volts . . divided into four circuits of 21/2 kilowatts each. Minimum efficiency is 80%. The lowest circuit of the mantle covers a small circular area surrounding the bottom center of the kettle. The three adjacent circuits provide heat for parallel circular band areas of the kettle. As the level of the liquid being heated recedes below the half-full point, power to the upper circuits can be decreased or shut off entirely. This prevents superheating of the bare kettle wall above the level of the liquid.

**ELECTRIC HEATING MANTLES** 

Specialists in Laboratory and Pilot Plant Heating Problems

When inquiring check CP 7573 opposite last page

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SSING

# **Moisture Costs Money!**



Save the high costs of too much or too little moisture! Measure moisture content quickly, economically with Granular Moisture Register G5 — insure product uniformity and quality!

1 minute test! No stopping for time-consuming, expensive laboratory tests.

Accurate readings to 0% within close tolerances!

Use on production line! Voltage regulated electronic power supply, or battery operated. No skilled technicians required.

Two Weeks Free Trial! Test the G5 in your plant No obligation. Satisfaction is guaranteed.

#### Guaranteed accuracy on these products!

Ammonium Nitrate
Ammonium Sulphate
Plastic Molding Compound
Ammonium Perchlorate
Sodium Bicarbonate
Polyethylene Resins

Dozens more powdered or granular materials, including many foods.

MOISTURE RE Moisture Register Ca., Do	Instrum	
☐ We are interested in 2 week information regarding Model (	ks free trial offer. Se 55.	nd additiona
We will want to test————in a moisture range from	% to	%.
	% to	<b>%</b> .
in a moisture range from	% to	%.
in a moisture range from		<b>%</b> .

When inquiring check CP 7574 opposite last page

LABORATORY

#### Gives rapid melting points from 10 to 260°C

Allowing rapid determination of melting points, hot benches have a temperature range from 10 to 260°C. Electrically heated, units have a chrome-plated hot bench with a nearly linear temperature drop. Accuracy is  $\pm 1$ °C. Temperature is read directly from instrument scale.

(Kofler Hot Benches are a product of William J. Hacker & Co., Inc., Dept. CP, 82 Beaver St., New York 5, N. Y. . . . or for more information about this product reader may simply check CP 7575 on the convenient Reader Service slip which is located opposite last page.)



Water is double-distilled in this single unit to eliminate danger of contamination. Still is fused quartz and produces water having conductivity of less than 2 × 10<sup>-6</sup> mhos. Capacity is approximately 400 ml per hour. Unit is rated at 700 watts.

("Bi-Distillation" unit is product of Amersil Company, Inc., Dept. CP, 685 Ramsey Ave., Hillside 5, New Jersey. . . . or for more information check CP 7576 on handy form opposite last page.)



A major innovation in this new Librascope manually operated decimal keyboard eliminates sticking switch contacts and high contact resistance. Self-wiping slide-type contacts eliminate necessity for any switch and contact adjustments. Resistance potentiometers are simulated by two voltage dividers—one each for the X and Y axes. All keys are released automatically after point is plotted. A variety of contact configurations available for manual feeding of decimal or binary coded decimal inputs to computer or other systems.

Write for catalog information.

#### FEATURES

DIMENSIONS - 8½" wide; 11" deep; 16" high.

WEIGHT-12 pounds.

POWER — Energized by voltage from recorder. No external source required.

Computers and Controls

IBRASCOPE

1607 FLOWER ST. . GLENDALE, CALIF.

When inquiring check CP 7577 opposite last page

# Get More Efficient Drying in ROCKWELL OVENS

Belt conveyor oven for continuous process drying; electrically heated.

Cabinet type, tray loading, electric recirculating oven.

Rockwell ovens are built to your requirements in standard cabinet and rack loading types or in conveyor types; electric, gas, oil or steam heated.



#### W. S. ROCKWELL COMPANY

Write for profusely illustrated catalog.

FURNACES . OVENS . BURNERS . VALVES . SPECIAL MACHINERY

2205 ELIOT STREET . FAIRFIELD, CONN.

Sales Representatives in Principal Cities

When inquiring check CP 7578 opposite last page

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SUPREME No. 502 S950.00 COMPLETE Less Motor

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Discharge: 1/2" to 4" — adjustable
Up to 500 Pounds per Minute

CRUSHES ANY MATERIAL
Hard, Soft, Resinous, Waxlike,
Brittle, Lumped, Caked, Granular.

FOR WAX, SPONGE IRON and Rosin, DDT, Resins, Asphalt, Salts, Glass, Chocolate, Asbestos, etc.

DESIRABLE OUTPUT, FEW FINES
Positive Chopping Action. Feed
and Discharge are Automatic.

RUGGED, HEAVY DUTY "SUPREME"

Many in Continuous Service for
35 Years . . . Results Guaranteed.

Free Test Run — Send 50 Pounds Your Material. Crushed to Desired Size, Returned.

Since 1918—"Supreme" Standard Crushers Range of Standard Models to meet your needs; from \$425. Immediate Shipment.

# SUPREME CRUSHERS

Mtd. by Franklin P. Miller & Son, Inc. 36 MEADOW ST., E. ORANGE 2, N. J.

When inquiring check CP 7579 opposite last page

Double-duty centrifuge for lab use
— quick switch from "quant" run
to continuous separation . . .

duplicates plant efficiencies and measures solids to five parts in 100,000

Uses: Centrifuges large numbers of samples for accurate solids control work and is quickly changed to continuous centrifuge for duplicating plant runs.

Features: As quantitative separator, it measures solids to approximately five parts in 100,000. Two test tubes with elongated tips make accurate reading easy. It requires only a few seconds to interchange continuous centrifuge bowl and duplicate separation efficiency of plant prototypes. Capacity

of continuous bowl ranges between one quart and 90 gallons an hour, depending on characteristics of liquid being centrifuged.

Description: Unit stands 24 inches high and occupies less than two square feet of table space.

Streamlined in appearance, it has no exposed moving parts. Two heads, one for batch quantitative determinations and the other for continuous centrifuging, fit drive spindle.

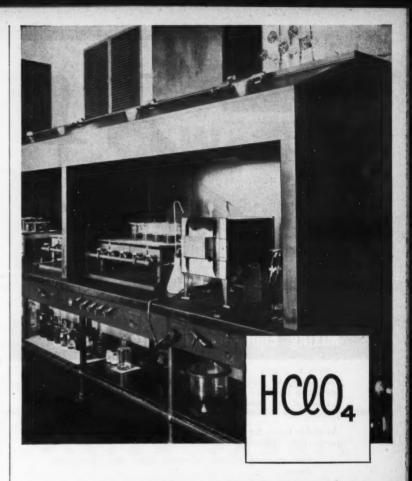
Spindle turns at 12,000 rpm. As a test-tube centrifuge, only 10 cc of material are required. Continuous centrifuge bowl is fitted with conical discs to divide liquid into thin layers for rapid separation. Top speed is reached in 20 seconds. Brake operates in 15 seconds.

(Gyro-Tester is product of De Laval Separator Company, Dept. CP, Poughkeepsie, N.Y. . . . or for more information check CP 7580 opposite last page.)

### All about tubes and bulbs — X-ray, flash, and TV

Methods of producing radio-isotopes, X-ray techniques, high-speed flash techniques, and discussions of secondary emission in picture tubes are principal topics of an issue of Philips Technical Review. The 32 pages of text are well illustrated and references are given.

Vol. 16, No. 1 of Philips Technical Review is issued by North American Philips Co., Inc., Dept. CP, Research & Control Instruments Div., 750 S. Fulton Ave., Mt. Vernon, N.Y. When inquiring specify CP 7581 on handy form opposite last page.



# Let's talk "LOW ABSORBENCY"

For perchloric acid fume hoods.

Alberene Stone has a low absorbency factor of 0.15%. It's essentially nonstaining. Easily cleaned. And readily machined for tongue and groove, watertight construction.

Both of these features are absolutely essential for perchloric hoods — where thorough water flushing and removal is necessary to keep them deposit-free.

Further, with Alberene Stone — the natural silicate stone whose surface goes all the way thru — the all-silicate mineral components resist chemical attack.

Our engineers are ready to help you select or design perchloric hoods or other special-purpose hoods. Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

# ALBERENE STONE

provides **LOW ABSORBENCY** protection

When inquiring check CP 7582 opposite last page

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ated.

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Gold rush to California-1849. Introduction of the first Stevenson mixers-1849; and the gradual expansion and perfection of the Stevenson mixer line down the years to the present date.

Available today for processing purposes in plant and laboratory are the following:

Side entering mixers, in many sizes. See illustration

Portable mixers ranging from small collapsible propeller model on up to large light and heavy duty, high speed, low speed and variable speed models. Large one in above illustration is a heavy duty unit.

Top entering mixers with wide range of propeller and mixing turbines and agitators. See vertical unit in above

Horizontal ribbon type mixers for wet and dry mixing of a wide variety of materials. Full range of sizes.

This equipment is widely used in the processing industries and for many purposes, It is modern in every respectstrictly modern. And it carries a broad guarantee.

20-page Bulletin No. 953A



Plant in Wellsville, Ohio Sales Representatives in Principal Cities

When inquiring check CP 7583 opposite last page

### LABORATORY

### **Identifies** isotopes by their spectrum of gamma rays

Recording spectrogammameter is a single channel recording pulseheight analyzer. It is designed for study of nuclear gamma ray spectra. It may be used for rapid identification of isotopes by their qualitative spectra and also for quantitative analysis of isotope concentration.

In addition to being able to identify isotopes, device reduces background considerably because it can be set for a narrow photopeak of a particular isotope.

Spectrogammameter consists of a shielded scintillation probe, longterm, high-regulated, negativepower supply, wide range preamplifier, linear amplifier, rate meter, scaler, and an X-Y recorder.

(Recording spectrogammameter is a development of Radiation Counter Laboratories, Inc., Dept. CP, 5122 W. Grove St., Skokie, Ill. Check CP 7584 opp. last page.)

### Drop 'em, they bounce!!! — plastic weigh-bottles

Unaffected by caustic solutions and acids, polyethylene weighing-bottles are unbreakable. Material is chemically inert, washable, non-toxic. One bottle has a capacity of 85 ml,



diameter of 15/8", height of 23/4". Another bottle has a capacity of 120 ml, diameter of 21/4", height of 2".

(Polyethylene weighing bottles are product of American Agile Corporation, Dept. CP, P.O. Box 168, Bedford, Ohio . . . or for more information check CP 7585 opposite last page.)



An exacting testing and production oven that provides very close heat uniformity. Built-in indicating temperature controls. Emphasis has been on heavy construction . . . even heat distribution . . . capacity loads at high speed . . . ability to "stand the gaff"-even under continuous 24hour-a-day usage. Six sizes and types are available for the endless variety of heating, drying, baking and testing processes. Get Bulletin No. 107.

ovens for all purposes



DESPATCH

When inquiring check CP 7586 opposite last page



### furnished in any length or finish

 For fast service on Pyrex Tubular Gauge Glass, contact Swift! We can supply Tubular Gauge Glass or Cylinders from stock in any length or finish . . . 2 mm. O.D. to 7" O.D. . . . for chemical, pharmaceutical or industrial applications. Write, wire or phone for immediate delivery.

# T Glass Division

When inquiring check CP 7587 opposite last page

CHEMICAL PROCESSING

Count

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Device

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# Count million objects in one second

electronic unit can count different sized objects together or separately

Electronic device can count up to one million objects of varying shapes and sizes in one second. It can be used to count impurities in raw materials, bacteria colonies in petri dishes and has even been used for mass counting of assorted machine parts such as nuts and bolts.



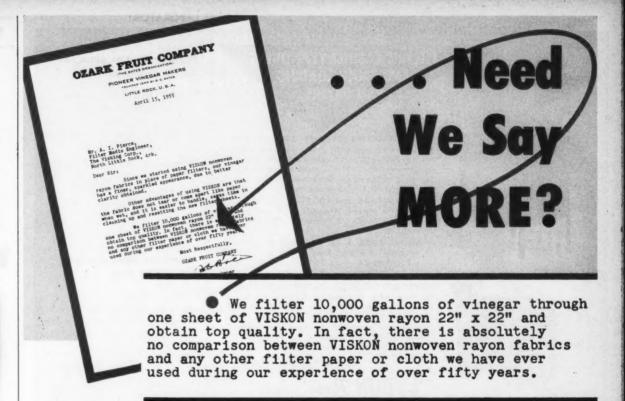
Electronic scanning device takes a quick look (I second) at objects and gives an accurate count on lighted numbers panel or in the form of a printed sheet when there is a permanent record desired.

Device "sees" objects placed in a special compartment at front of unit, counts them one by one and transfers results in lighted numbers.

Irregularly shaped objects are counted correctly. For instance a doughnut and penny placed side by side will be counted as two objects. The penny can be placed in the hole of the doughnut and still be counted. Discs perforated with holes, and overlapping objects are also counted correctly.

By changing optics of the instrument, particles in air such as coal dust in mines, chaff or flour in flour mills, or particles of paint or metal shavings in process plants, can be quickly spotted.

(Iconumerator is a development of Allen B. Du Mont Laboratories, Inc., Dept. CP, 750 Bloomfield Ave., Clifton, N. J. . . . or for more information check CP 7588 on handy form opposite last page.)



# VISKON® FILTER FABRIC TOPS ALL in PLATE and FRAME presses!

If you have plate and frame filter presses—then try VISKON. You may have the same successful experience as did the Ozark Fruit Company.

Such success would not be unusual.

Many plant engineers are discovering the unique characteristics of VISKON filter fabrics. Here are a few:

VISKON is so effective as a filtering medium that fewer plate and frame presses are needed.

VISKON is easy to clean. Filter cake can be tapped or scraped off in seconds—thus cutting downtime to a bare minimum.

VISKON is so inexpensive it can be used for several filter cycles and then discarded. No laundering costs . . . no waste of time.

VISKON has an amazing wet strength—yet maintains a high flow rate.

VISKON gives you a clearer filtrate at substantial operational savings.

VISKON filter fabrics are available in 400 basic weights and finishes in cotton and synthetic fibers which can be tailor-made to fit your own particular filtering need. In short—your entire filtering operation may be stepped up with VISKON filter fabrics. Your inquiry for further facts is cordially invited.

Use This Handy Coupen, or
Dictate Your Inquiry Letter To:
Mr. A. I. Pierce, Filter Media Engineer
THE VISKING CORPORATION
P. O. Box 72 . . . North Little Rock, Arkansas
NAME
ADDRESS
CITY\_\_\_\_\_ZONE\_\_STATE
Type of Filter Press:



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### Dependable · High Quality

### ELECTRIC CABINET TYPE OVENS AND TRUCK LOADING PAN DRYERS



LYDON ELECTRIC CABINET TYPE OVENS for glass annealing, glass decorating, heat treating, etc. Packaged units feature electrically heated temperatures to 1200° F.—Internal air circulation for good temperature distribution—Excess temperature cut-off and automatic controls.

Models 1336 and 1337T-12 for average size pieces. Available in 20 sizes from 24" W. x 24" D. x 30" H. to 48" W. x 48" D. x 48" H.

Model 1338 T-12 for long pieces— Available in 6 sizes from 18" W. x 36" D. x 20" H. to 24" W. x 72" D. x 24" H.

Send for Data Sheet 1337-T12

LYDON ELECTRIC TRUCK LOADING PAN DRYERS for atmospheric pan drying of plastic powders and pharmaceuticals. Available in various capacities, 24 to 60 trays. Completely packaged units require only connection to fused line switch. Features—200° F—Cross-flow air circulation—Automatic temperature control—Excess temperature cut-off.

Send for Data Sheet 3327-72

### LYDON Bros., Inc.

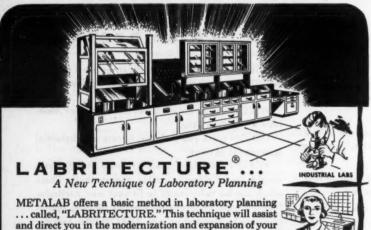
87 Zabriskie Street,

Hackensack, N. J.

**EDUCATIONAL** 

OFFERING THE EXPERIENCE OF 15 YEARS AND MORE THAN 1000 INSTALLATION

When inquiring check CP 7590 opposite last page



METALAB offers a basic method in laboratory planning ... called, "LABRITECTURE." This technique will assist and direct you in the modernization and expansion of your laboratory or in planning a new one. Our new 4B Catalog and Manual will give you the sound basis for solving these laboratory problems.

For complete "LABRITECTURE" details request our new 180-page Catalog 48.

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230 DUFFY AVENUE, HICKSVILLE, L. I., N. Y.

	CORP., 230 Duffy Ave., Hicksville, L. I., N. Y. copy of your new 180-page Catalog 48 to:
Name	Title
Company	
Address	

When inquiring check CP 7591 opposite last page

### LABORATORY

### Mixers adapt to glass jars — one to five gal sizes

Adapting to wide-mouth glass jars, electrical mixers use three-blade aluminum propellers, are suitable for one, two, three and five gallon jars or other containers.

(Mixers are product of Southern Electric Products, Dept. CP, P.O. Box 406, Anderson, S. C. Check CP 7592 opposite last page.)

# Automatic pipet washer has minute flush

Operating with one-minute flushing cycles, automatic pipet washer has safety wall rack to prevent short pipets from falling out.



Washer is stainless steel and brass, and has a protective coating on washer cylinder and base.

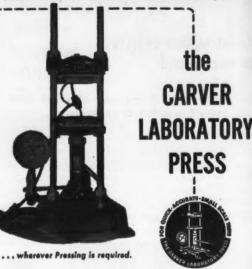
(Model 6312 automatic pipet washer is product of National Appliance Co., Dept. CP, 1238 S.E. Union Ave., Portland, Ore. Check CP 7593 opp. last page.)

# Explains exposure meter for microphotos

Illustrated data sheet explains an exposure meter for photomicrography.

"Microphot" is issued by Gamma Instrument Co., Inc., Dept. CP, 378-380 Great Neck Road, Great Neck, L.I., N.Y. Specify CP 7594 opposite last page.





Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

### FRED S. CARVER INC. HYDRAULIC EQUIPMENT

52 RIVER ROAD, SUMMIT, N. J.

When inquiring check CP 7595 opposite last page

The Perfect Pump for Chemical Laboratories . . .





- Here's Why! All parts in contact with pumped liquid are stainless steel.
  - Cone-to-taper fittings prevent materials handled from contamination by the pump.
  - Adaptable to many highly specialized uses. It can be equipped to facilitate handling of high melting materials, to pump low boiling materials, to handle gaseous materials.
  - It's compact—6" x 3½" x 10¾"; weighs 5.6 lbs. Made in three sizes for pump rates of 15 to 1000 ml. per hour; 30 to 2000 ml. per hour; and 30 to 7000 ml. per hour. Also available in "Teffon."

We have a booklet that gives all construction, operation and application details of the Corson-Cerveny Micro-Bellows Pump. Write for your copy.

### RESEARCH APPLIANCE COMPANY

143 Cemetery Lane, Pittsburgh 9, Pa.

When inquiring check CP 7596 opposite last page

CHEMICAL PROCESSING

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Uses: for ana sium, chromin

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Less than one minute per analysis at accuracy of  $\pm$  1 % . . .

flame photometer is capable of still better accuracy when more time and care is taken

Uses: Flame photometer is specially designed for analysis of solutions of sodium, lithium, potassium, magnesium, calcium, strontium, barium, chromium, manganese.

Features: Readings are shown by means of counters rather than vernier dials. This permits simple and precise readout of data — even with inexperienced operators.

Description: Molded fiber glass panel contains controls and reading counters. Internal mechanism includes a two-prism monochromator



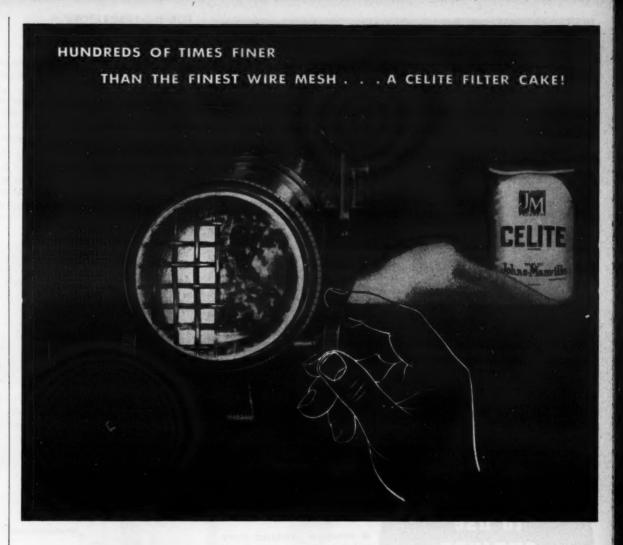
Readout of data is taken from counters instead of calibrated dials

which discriminates between elements. This monochromator provides for rapid selection of wavelengths of all elements emitted in gas flame. Sensitive, stable electronic amplifier is used to boost photocell signal.

Burner may be used on natural or manufactured gas as well as propane or acetylene. Atomizer is designed for easy cleaning and efficient drain arrangement. Main instrument cabinet removes as a unit, exposing internal parts for servicing.

Photometer may be operated as a single reading instrument or as an internal standard ratio instrument. Time required for analysis is less than 1 minute per element with accuracies in the neighborhood of 1%. Accuracies better than 1% are possible with more time and care. Sample size is two to five milliliters.

(Model 146 Flame Photometer is a development of Perkin-Elmer Corp., Dept. CP, Main Ave., Norwalk, Conn. . . . or for more information concerning manufacturer's product, reader may simply check CP 7597 on handy Reader Service slip which is located opposite last page.)



# With Clife Filtration you are assured perfect clarity

Here is a clarification method which can remove even the finest suspended solids . . . a Celite\* Filter Cake contains more than 2,500,000 filter channels per square inch of surface. Here, too, is a method so flexible that it permits the right balance of fast flow rate and high capacity, with the degree of purity and clarity required.

Celite powders may be used with any type of conventional filter. Only 2 simple steps are required. First, a "pre-coat" of Celite is deposited on the filter medium. Second, small amounts of Celite are added to the solution, to form a con-

tinuously fresh filter surface. To meet different filtration requirements, Celite is available in nine standard grades of microscopically controlled particle size. Utmost uniformity is assured by exclusive processing techniques.

The extraordinary efficiency and flexibility of Celite Filtration have made it the standard for entire industries. For perfect clarity in food products such as jellies, sugar, wine, beer . . . for highest purity in antibiotics . . . for removal of impurities from chemicals, petroleum, dry cleaning solvents . . . Celite offers unequalled advantages.

If you want to improve your present filtration system or find an economical way to utilize filtration in your processing, investigate the Celite method now. One of the Johns-Manville Celite Filtration Engineers will gladly discuss your problem. These men are backed by complete technical services and the Johns-Manville Research Center, largest laboratory of its kind in the world. For further information write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

\*Celite is Johns-Manville's registered Trade Mark for its diatomaceous silica products.



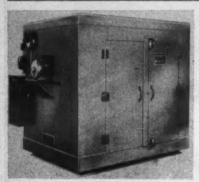
# Johns-Manville CELITE FILTER AIDS

When inquiring check CP 7598 opposite last page

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### YOUNG BROTHERS OVENS and DRYERS

# for Uniform Results in Baking, Drying, Curing. Dehydrating



Electrically heated, multiple shelf-type dryer with automatic indicating control

Young Brothers designs and builds Ovens and Dryers to meet the special needs of the chemical field. Efficient, trouble-free processing is assured through accurately controlled temperatures and positive air

Among leading concerns using Young Brothers Ovens are Reichhold Chemicals, Inc., Parke, Davis & Co., Glidden Co., Upjohn Co., Atomic Energy Commission, E. Lilly Co., General Foods, Union Carbide &

Young Brothers Ovens are available in Standard and Special Designs. Batch and Conveyor Types. Write for Bulletin 17 today!



### YOUNG BROTHERS COMPANY

1825 Columbus Road

Cleveland 13, Ohio

When inquiring check CP 7599 opposite last page

why it pays to use SHRIVER Filter Presses



Shriver filter presses in vegetable oil refinery

- Filter for clarification or solids recovery, at any desired pressure, temperature,
- Use any filter media and filter aids.
- Minimum unfiltered slurry is left in filter at end of run.
- Filter cake can be thoroughly washed and extracted.
- Residual slurry can easily be blown out and dried, redissolved or melted in the filter press.
- Uniform cake of any desired thickness is easily removable and disposable.

The new Shriver Catalog No. 55 tells plenty more about the production economy advantages of Shriver Filter Presses. Write for a free copy.

T. SHRIVER & COMPANY, INC.

846 Hamilton St., Harrison, N. J.

Filter Media

Diaphragm Pumps

San Francisco 7. Calif.

Houston, Tex.

Richardson Agencies, Ltd. Montreal, Que.

When inquiring check CP 7600 opposite last page

FOR THE LABORATORY

Glass blowing made "easy"

> Explaining the "easy" art of laboratory glass blowing, 20-page booklet gives step-by-step instructions on fundamental glass-blowing operations. Equipment required is listed and described.

> "Laboratory Glass Blowing With Pyrex Brand Glasses" is issued by Laboratory and Pharmaceutical Sales Dept., Corning Glass Works, Dept. CP, 1949 Crystal St., Corning, N.Y. When inquiring specify CP 7601 on handy form opposite last

Analyze many organic compounds in ultraviolet light region by spectrophotometer . . .

> increased ultraviolet efficiency gives better results to 1900A

Uses: Analysis of many ketones, alcohols, monoolefins, other compounds in ultraviolet range.

Optical elements in prism grating double monochromator have increased ultraviolet efficiency over manufacturer's previous model.



Improved recording spectrophotometer performs below 2100A. Optical elements have high resolving power in ultraviolet, visible and near infrared regions.

(Recording spectrophotometer is product of Applied Physics Corporation, Dept. CP, 362 W. Colorado St., Pasadena, Calif. . . . or for more information check CP 7602 opposite last page.)

15 gallon capacity p-Ic STANDARD PILOT PLANT



Like other pk pilot plants, this packaged unit combines maximum flexibility and accuracy with low cost. Its key elements of kettle, condenser, decanter, receiver and piping provide a complete and compact apparatus for general experimentation in the manufacture of resins and similar processes.

Design pressure for all vessels, jackets and piping is 150 PSIG and full vacuum. Internal contact surfaces are stainless steel, ground smooth.

KETTLE: Dowtherm electric heating jacketinternal cooling coil. Reactor designed for 650°F. Variable speed agitator. CONDENSER: Removable core type. Water

cooled shell. DECANTER: Removable top head.

RECEIVER: 5 gallons capacity. Removable top head.

INSTRUMENTATION: Temperature recording controller and pressure indicator on reactor. Indicators for pressure, liquid level, temperature on reactor jacket. Other indicators on condenser, decanter, receiver. Flow indicator in condenser discharge

Write today for further details on Model 613 and other standard p-k pilot plants. By checking p-k first, you can save original design cost and cut engineering and delivery time on the equipment you need. The Patterson-Kelley Co., Inc., 760 Lackawanna Avenue, East Stroudsburg, Pa.

### PATTERSON-KELLEY

Offices: New York, Chicago, Philadelphia, Boston and other principal cities

When inquiring check CP 7603 opposite last page

CHEMICAL PROCESSING

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taken car cost when ment. Ov able fron every req

All your

pendable equipmen items we our factor turing eff tive bulle

IMMEDIATE DE Hi-Speed

Rheostat speeds 1800 suitable for

suitable for semi-micro and difficu separation eight 15 ml tapered tul ters for 1/ tubes. Data

Heaters a

Built spec apparatus heaters. T able heat Kontrol transform from 0 to and Type built-in the log 600.

Mag-Mix

Magnetical liquids und in vacuum cous liqui batches of stat contri ranges. T models, on for safe us mable liqu tins 590-R

Micro-Set

marrow list

Precisio

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### PRECISION

All your laboratory needs can be taken care of quickly, at lowest cost when you buy Precision equipment. Over 1500 items are available from Precision to meet your every requirement.

And you can be sure of long, dependable service from Precision equipment because we make the items we sell. Quality control in our factory plus Precision manufacturing efficiency assure you of top performance. Write us for descriptive bulletins.

IMMEDIATE DELIVERY ON THESE ITEMS:

### **Hi-Speed Centrifuge**

Rheostat controlled speeds 1800-5000 rpm suitable for micro and semi-micro analysis, and difficult chemical separations. Holds eight 15 ml straight or tapered tubes. Adapters for 1½ to 5 ml tubes. Data sheet 204.

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### Heaters and Hot Plates

Built specifically for lab service. High quality porcelain refractory tops. Provisions for apparatus set-ups on heaters. Two adjustable heat types: Fulkontrol with autotransformer control from 0 to 750 watts and Type RH with built-in rheostat. Catalog 600.



### Mag-Mix Stirrers

Magnetically agitate liquids under pressure, in vacuum. Mix viscous liquids, Stir batches of test tubes simultaneously. Rheostat controlled speed ranges. Two electric models, one air model for safe use with flammable liquids. Bulletins 590-R and 595.



Micro-Set Thermo-Regulators



Control temperature within very narrow limits (models as sensitive as ±0.005°F). Operate electrical relay which controls heating elements, etc. Temperature setting may be pre-set or changed. Range spans as wide as −35° to +500°F. Bulletin 647A.

### Precision Scientific Company

3747 West Cortland Street Chicago 47

When inquiring check CP ,7604 opposite last page

FOR THE LABORATORY

No calibration curves, tables meter of flame photometer reads directly . . .

shows milliequivalents for sodium, postassium

Redesigned, compact flame photometer simplifies operation. Meter is calibrated directly in milliequivalents of sodium and potassium.

Flame operation is instantaneous. Pilot light and preset adjustments are used at the flame. Proper filter is automatically switched into place when sodium or potassium lever is moved into position.



Filters in calibration unit switch into place automatically when analysis is selected

At the same time correct calibration potentiometers are put into operating position. Manufacturer's tests show that technicians without previous experience can learn to handle 50 to 60 determinations an hour quickly.

Detection range indicated on meter is 0 to 2.8 milliequivalents per liter for sodium and 0 to 0.14 milliequivalents per liter for potassium.

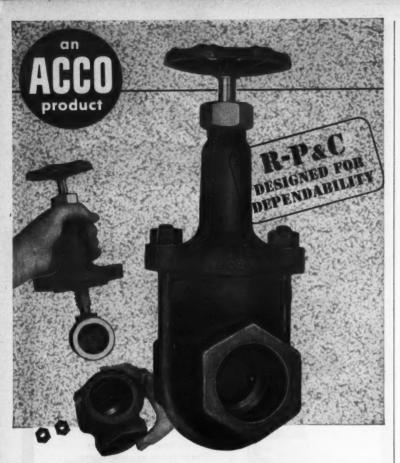
(Further information on flame photometer is available in Bulletin 396 issued by Beckman Division, Beckman Instruments, Inc., Dept. CP, Fullerton 1, Calif. . . . check CP 7605 opposite last page.)

For the latest in laboratory equipment . . .

look in the alphabetized, itemized Product Directory beginning on page 214. All articles presented in this issue of CHEMICAL PROCESSING are listed there.



When inquiring check CP 7606 opposite last page



# for Easier Cleaning!

-R-P&C IRON BODY CLIP GATE VALVES

• R-P&C clip gates were developed specially for those applications in the chemical and petroleum industries where ease of cleaning is a big factor. With these rugged valves you simply remove two nuts, then lift up the bonnet, stem and gate assembly in one piece for easy access to the entire valve body.

Ease of maintenance and sturdy construction make these clip gates preferable over bronze gate valves in many applications. Rated for 150 lbs. steam, or 225 lbs. owg, clip gates are furnished in sizes from ¼ " to 3",

with screwed ends. Normally furnished with bronze trim, they may also be supplied in all-iron for use

with fluids which attack bronze.

FREE SLIDE RULE
Valve selector slide rule
gives all dimensions for
iron body and steel
valves in pressure classes from 150 to 1500 lbs.
Write for yours.

All castings used are of close-grain, hi-test gray
iron, 50% stronger than ordinary iron, from R-P&C's
own foundry. Their construction embodies quality
features that are characteristic of R-P&C's complete
valves in pressure classset from 150 to 1500 lbs.
Write for yours.

See your R-P&C Distributor or write for catalog



# R-P&C Valve Division AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.



When inquiring check CP 7607 opposite last page

# briefs

om contemporary publications

### Water troubles - and cure

Attention is called to the troubles that are caused in industry by water. Methods of diagnosis and choice of remedies are suggested. Five pages, 5 photographs. ("Plant Engineering," January, 1955, page 77.)

### Treating H<sub>2</sub>O by Si

Following aspects of water treatment by activated silica are discussed: silica activation, advantages of various sols, sedimentation units, upflow clarification, filter operation, and batch and continuous preparation of sols. ("Journal of the American Water Works Association," Feb., '55, page 175.)

### Insulation studies

These "in-place" studies of insulated structures cover apparatus and testing methods, evaluation of conductivities, reflective insulation, and durability of wood. Fifteen pages, 16 figures, 21 references. ("Refrigerating Engineering," Feb., '55, page 40.)

### Rubber for truck tires

Comparison of neoprene, sodium rubber, and GR-S as used in truck tires includes ratings for durability, tread wear, and efficiency. Possible correlations are considered. ("Rubber Age." Feb.. '55, page 709.)

### Pulp and paper survey

Expansion in the pulp and paper industry is appraised. Attention is given to rate of growth, economic climate, effects of expansion, market development, and the export situation. Three pages. ("Paper Industry," February, 1955, page 1092.)

### Cost of ammonia

Detailed comparisons of the economics of manufacture of ammonia from coal, natural gas, residual oil, coke oven gas, and reformer gas are presented. Costs of materials, utilities, and operation supplement fixed charges in these studies. Flowsheets for four processes are given. Five pages, 4 tables, 4 figures. ("Petroleum Processing," February, 1955, page 223.)

### Fog in condensers

From England comes a discussion of the formation of fog in cooler-condensers. Reduction of such fog can be achieved by proper design and operation of the equipment. Fundamental equations are included. Ten pages, 5 tables, 8 figures, 21 references. ("The Industrial Chemist," January, 1955, page 22.)

### What size generator?

This study of the optimum economic size of steam-electric generator units for addition to a power system deals with rate of growth of load, size of system, installed cost, and other factors. Eight pages, 2 tables, 15 figures, 4 references. ("Combustion," February, 1955, page 57.)

### High alpha-cellulose pulp

Production and properties of high alphacellulose wood pulp are covered in detail. Attention is paid to effects of pulping conditions, refinement of raw stocks, and multiple-stage pulping. Alpha-cellulose content should be corrected for other components that resist alkali. Methods for elimination of hemicellulose are given. Thirty-two pages, 27 tables, 16 figures. ("Tappi", March, 1955, page 129.)

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abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service for you . . .

### Gas analysis by infrared

Use of the infrared spectrometer for analysis of light hydrocarbons is illustrated in detail. A typical five-component system is demonstrated. Continuous analysis of the process stream is possible. ("Petroleum Refiner," February, 1955, page 155.)

### Waste water treatment

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The treatment and recovery of waste water by means of ion exchange is discussed. Applications to mixed plating rinses are covered, and operating costs are given. Four pages, one table, 4 figures. (\*\*Plant Engineering," February, 1955, page 108.)

### **Electroplating filtration**

Application of filters in electroplating is discussed under the headings of sources of contamination, rough deposits, filtering methods, and plating baths. Attention is given to plating of cadmium, chromium, copper, iron, lead, nickel, silver, tin, and zinc. Seven pages, 2 tables, 6 figures. ("Metal Finishing," February, 1955, page 52.)

### Tank economies

For tanks used in petroleum refineries, suggestions that bear on choice, erection, maintenance, and retirement are made. Attention is paid to costs of painting such tanks. Five pages, 4 figures. ('Petroleum Processing", March, 1955, page 361.)

### **Triglycerides**

In the presence of nickel, triolein was hydrogenated at various temperatures and pressures. A mechanism for the hydrogenation of triglycerides was proposed. Four pages, one table, 4 figures, 21 references. ("Journal of the American Oil Chemists' Society," February, 1955, page 69.)

### Dyeing blends of fibers

"Miracle" fibers were originally intended to be used alone, but are now blended with older fibers. This discussion of dyeing of blends of viscose rayon with Dynel, Dacron, Orlon, and Acrilan is supplemented by a treatment of dyeing of binary and ternary blends where cotton or acetate is involved. Four pages. ("American Dyestuff Reporter," March 14, 1955, page 191.)

### Fractionation computation

Method for computing composition of the products from a multicomponent fractionating column is given. Reflux ratio, number of plates, and composition of feed must be known. ("Petroleum Engineering," February, 1955, page G-42.)

### Oxygen scavenger

The use of hydrazine as an oxygen scavenger in boiler feed water is described under headings of equipment, internal treatment, critical inspection, handling precautions, control methods, and advantages. Cost data are included. ("Power", March, 1955, page 99.)

### Survey of adhesives

Various kinds of vegetable adhesives, animal glues, and synthetic resin adhesives are discussed. Properties, methods of application, and industrial uses are presented in convenient tabular form. ("Mill and Factory", March, 1955, page 117.)

### Fillers in silicone rubber

Investigation of filler phenomena in silicone rubber covers particle size, structure of filler, crystallinity, nature of silica surface, and mw of polymer. ("Industrial and Engineering Chemistry", March, 1955, p 486.)



• Peabody Direct Fired Air Heaters are so adaptable, effective and efficient, that they're continually specified and used where high-temperature air, above or below atmospheric pressure, is required for intricate processing problems. With a particular air heater, outlet temperatures and firing rates can be varied and controlled either manually or automatically. Variations in firing rate and air flow of 5 to 1 (and even greater) are easily attained. Heaters may be fired vertically up, vertically down, or horizontally, as desired. Low pressure loss—a few inches of water—cuts power waste and—there's no high pressure blower needed with a Peabody Direct Fired Air Heater. For full details write for Bulletin 600A.

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On Chemical Plant Applications



In the Petroleum Industry

QCf 💮

**PLUG VALVES** 

When inquiring check CP 7609 opposite last page

### BRIEFS

(Continued from preceding page)

### Pressure losses

Study of pressure losses for air flowing through round elbows deals with 7-inch, 22-gage galvanized steel ducts that have center-line radii of 17½ inches. Pressure losses are about 20 per cent of velocity head. Three pages, 4 figures, 2 references. ("Heating, Piping, and Air Conditioning", March, 1955, page 130.)

### **Dust collection**

Studies of the performance of wet dust scrubbers include comparison of equipment, effect of pressure drop, determination of efficiencies, influence of injection of steam, operating variables, type of dust, and mechanism of scrubbing. Twelve pages, 16 figures, 4 references. ("Chemical Engineering Progress", March, 1955, page 110.)

### Rotary kilns

Covers these points in connection with rotary kilns: causes of heat losses; factors that control capacity; development trends; and surveys of draft, temperature, and gas analysis. Six pages, 4 figures. ("Rock Products", March, 1955, page 82.)

### **Drinking fountains**

Nearly all the public drinking fountains examined in this survey revealed streptococci contamination in the bowl, orifice, and orifice guard. Bubble fountains offend more than do the angle-jet type. Eight pages, 5 tables, 1 figure, 10 references. ("Journal of the American Water Works Association", March, 1955, page 235.)

### **Extruded aluminum**

This discussion of aluminum impact extrusions deals with shapes, difficulties, saving in machining, and uses. Backward, forward, and opposed extrusions are covered. Two pages, 2 photographs. ("Steel", March 7, 1955, page 102.)

### **Powder metallurgy**

Suggestions for selection of a powder metallurgy process are presented. Tables of physical and cost data are given. Five pages, 4 tables, 5 references. ("Precision Metal Molding", March, 1955, page 34.)

### Lignins

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This summary of the chemical and physical properties of lignins includes methods of separation of lignin from cellulose, an exploration of the chemical nature of lignin, and a discussion of its uses. A digest of patents that deal with lignin derivatives and their utilization is given. Six pages, 1 figure, 2 photographs. ("Paper Industry", March, 1955, p 1214.)

### Ignition of coal

Rate of ignition of pulverized coal depends upon heat transfer by conduction and radiation. Effects of fineness and rank of coal, furnace atmosphere, distribution of fuel, and aerodynamic patterns are discussed. Five pages, 10 figures, 10 references. ("Combustion", March 1955, page 57.)

### Metallizing

Spraying of molten zinc and aluminum on iron and steel to prevent corrosion is covered. Attention is paid to preparation of surface, bonding coats, and organic sealers. Railway, marine, and industrial applications are considered. Four pages. ("Corrosion", March, 1955, page 29.)

### Liquid-liquid extraction

From England comes a presentation of the theory and mechanism that underlie interphase transfer. Chemical reaction at the interface is considered and kinetics of transfer are discussed. Ten pages, 7 tables, 6 figures, 69 references. ("Industrial Chemist", February, 1955, page 63.)

### Hay crushing

For forage crops, tests on crushing equipment and investigations of procedures cover weather conditions, drying rates, multiple passes, roll pressure, roll speed, feeding charcteristics, and stripping of leaves and stems. ("Agricultural Engineering", March, 1955, page 165.)

### **Fertilizers**

Effect of water solubility on phosphatic fertilizers is considered in survey. Attention is accorded phosphate sources for corn and oats and to fertilizers for calcareous soils. Three pages, 3 tables, 1 figure. ("Agricultural Chemicals", March, 1955, page 44.)



Mr. Design Engineer



Mr. Purchasing Director



Mr. Plant Superintendent

### BROWN FINTUBE DESIGN PROTECTS YOU AGAINST

# YOUR Occupational Hazard

If it hasn't happened to you yet,—it will. Beware!

Some day the company is going to decide to make a new product at your plant. The "market analysis and research" department will assure you the maximum requirement is so many thousand gallons a week. You'll design the plant . . . buy the equipment . . . get on stream . . . and then two or three months later - BOOM!

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That's what we call "flexibility". You can change from one duty to another any time you want. You can even dismantle an exchanger, ship the sections to one or three or four different plants, and put them right back in service again.

Many of the biggest, best known and lowest cost companies are keeping flexible by using Brown Fintube Sections throughout their plants. Why don't you play it safe too? Available with mild steel, stainless, alloy and non-ferrous fintubes in standard sizes - for a wide range of capacities

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We've just discovered Clearsite Plastic Containers."

Moisture - tight! Dust - proof! Non-toxic! Just three of many reasons why Clearsite makes an ideal container. Available in many sizes and varieties of closures. Any trade-mark or label can be multi-color printed right on the feather-light, shatterproof container.

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BAG CLOSER

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- Requires no installation . . . plug into any outlet.
- Handles textile and paper
  bags.
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- Lowest priced bag closer on the market.

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### packaging

The filling machines at Shell Oil's Sewaren, N.J.
plant were frequently idle because a sufficient supply
of cans couldn't be maintained on the feed lines.
But a veteran mechanic had an idea and his —

# simple turntable feeds cans fast



Turntable in normal operating condition. Cans entering from main conveyor (arrow, left) and tributary gravity conveyor (center arrow) are discharged single file back onto main conveyor (arrow, right)

Strategically-located devices take cans from as many as four box cars at once and deliver them in a single, continuous stream at rates to 500 per minute

Problem: When new filling machines were installed at the Sewaren, N.J. plant of Shell Oil Company, they were frequently idle because a sufficient reserve of cans couldn't be maintained on the feed lines. Cans are delivered in bulk and they were being moved from box cars to filling machine on a single drag line cable.

Assigning extra feeders to the box cars did no

good; extra men were in each other's way and could not increase the rate of machine production appreciably. Engineers were called in on the problem, and all suggested the same treatment: separate lines from the box cars, with the lines converging into a common feed adjacent to the can filler, handy for operation.

Solution: A veteran mechanic at the Sewaren

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original rail. He in diam feed lindrag lindrag

Movement by a tall rail inviguide in turntable single fitilted asturntable

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An imp which conto take upsetting line onto cans procans froleft turn returns

movemer Results: into the ficiency of feed 500 cans at full from 28 is expect near futo

(Inquiri Shell Fo Shell D 50th St. informat CP 7612 last page

\*Patents

CHEMICAL PROCESSING

plant developed the simple mechanism to implement the engineers' suggestions. This turntable is described as being "adapted for handling empty cylindrical cans from a plurality of sources and delivering them as a single continuous stream."

The can-feed system now used still employs the original motorized drag line conveyor and guard rail. However, a number of these turntables, 36" in diameter, have been strategically located in the feed line. They are rotated by the power-driven drag line.

In operation, cans leave box cars (two or more) with a gravity rolling motion and are then set vertically in single file on the conveyor line. Cans from intermediate spots along the line enter the main conveyor systems by moving first on to one of the rotating turntables (see photo). Here they mingle with cans coming in on the main line. Centrifugal force resulting from table rotation moves all cans toward the outside of the table, from where they are discharged, single file, onto the drag line.

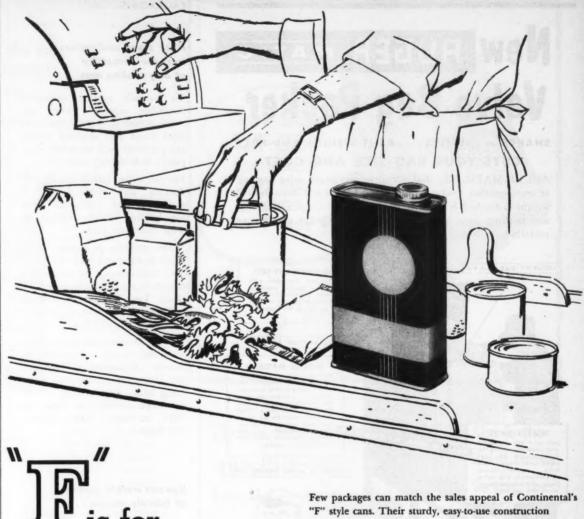
Movement of cans onto the drag line is facilitated by a take-off guide extending from the drag line rail inward over the turntable. Upper edge of guide is curved against direction of rotation of turntable to deflect cans on to main conveyor in single file. Guide also rights many cans that are tilted as they move along around periphery of the turntable.

An important part of table is the braking device, which controls flow of cans from main conveyor onto table. This device keeps cans from colliding, upsetting, or jamming as they move from main line onto turntable. If table becomes too crowded, cans press against brake and thus restrict entry of cans from main conveyor until enough cans have left turntable to relieve congestion. Then brake returns to normal position, permitting unimpeded movement of cans.

Results: Incorporation of the Feeder Turntable into the can-feed lines has permitted maximum efficiency of canning operation at a low cost. Speed of feed line can be varied to provide rates up to 500 cans per minute. Filling machines can operate at full capacity. Production has been increased from 2800 24-can cases a day to 3800. Production is expected to reach up to 5000 cases a day in the near future.

(Inquiries pertaining to use or licensing of the Shell Feeder Turntable\* should be directed to Shell Development Company, Dept. CP, 50 W. 50th St., New York 20, N. Y. . . . or for more information on the device reader may simply check CP 7612A on handy form which is located opposite last page.)

\*Patents pending.



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Few packages can match the sales appeal of Continental's "F" style cans. Their sturdy, easy-to-use construction is a selling point in itself. When our master lithographers add color and design, your polishes, waxes, etc. are groomed for success in heaviest competition.

As for deliveries, you name the date. Tailor-Made Package Service guarantees all the "F" style cans you need, in sizes from four-ounce (spout top) to gallon, at your convenience. Continental research and engineering services are available to help you with any problem, large or small.

Why not see what "F" style cans can do for your chemical product? Simply phone your nearest Continental office. It will be a pleasure to talk with you.

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When inquiring check CP 7613 opposite last page

# New AUGER-MATIC Valve Bag Packer

SHAKES . . . SETTLES . . . AS IT WEIGHS AND FILLS
CUTS YOUR BAG SIZE AND COST

AUGER-MATIC fills, shakes and weighs paper valve bags all in one operation. Just push the starter button and when desired weight is reached it shuts off automatically. Cuts cost of bags and packing costs on powdered, granular, pellet and fibrous materials . . . reduces dust to a minimum.



Fill Valve Bags as Small as 10 Pounds

Your Present Auger-MATIC is now more versatile than ever

New small sizes spouts and augers now available to fit production requirements on 10 to 25 pound bags. You can change in a matter of minutes from packing 100 pound bags the 10 pound valve bags ... cut

to the 10 pound valve bags . . . cut cost by using minimum size bags for exact weight desired.

For further information... call or write

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When inquiring check CP 7614 opposite last page

### PACKAGING

### Floor stand and rollers increase versatility of bag-sealing unit

To provide greater operating flexibility, especially when machine is tied in with a conveyor, floor stand and optional rollers are provided on a model of company's heat-sealing units.

For permanent installation in production line, floor stand is equipped with adjustable studs for leveling sealing mechanism with conveyor table.

When mobility is desired, floor stand is equipped with 4" diameter, ball bearing swivel casters, mounted on adjustable leveling studs. Two of the casters have locking wheel brakes to prevent machine from shifting.

(Model S heat-sealing machine with floor stand is a product of Amsco Packaging Machinery, Inc., Dept. CP, 31-31 48th Ave., Long Island City 1, N.Y. . . . or for more information check CP 7615 on handy form opposite last page.)

# Ups net weight content of barrels, drums . . .

vibratory packer capacity is 2000 lb

Uses: To increase net weight content of shipping containers such as barrels and drums.

Features: Packer has a steel 48 x 48" vibrating deck and a capacity up to 2000 lb.

Description: Vibratory packer is powered by a "semi-noiseless" pulsating magnet, striking parts of which contact a rubber bumper and keep operating noise to minimum. Packing action of unit is instantaneous. Variable control permits operator to adjust amplitude of vibrations to right degree.

(Model VP-600 vibratory packer is a product of Syntron Company, Dept. CP, 110 Lexington Ave., Homer City, Pa. . . . or for more information check CP 7616 on handy form opposite last page.)



When inquiring check CP 7617 opposite last page

### VIBRA SCREW

# revolutionizes

### DRY MATERIALS FEEDING\*

UNMATCHED ACCURACY — 1% by actual weight on most materials, granular or amorphous, free flowing or sticky. Compare this feeder minute to minute with any other feeder, regardless of make, type, or cost

UNMATCHED SIMPLICITY — No delicate scales, weigh-belts, sensing or controlling mechanisms. The unique accuracy is inherent in the basic principle itself, so that no flimsy gadgets are needed to attempt correction of erratic operation

UNMATCHED RELIABILITY — The Vibra Screw Feeder is as dependable as an electric motor, and readily maintained. Anyone can take it apart and reassemble it easily and quickly

UNMATCHED RANGE — Equally applicable to feeding ozs, or tons per hour. Wide range in any given size without loss of accuracy



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### Vibra Screw

P. O. Box 25 Glen Ridge, N. J.

... for tests on your materials. No obligation of course.

\*Patents Pending

When inquiring check CP 7618 opposite last page

CHEMICAL PROCESSING

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Whether any duty glass equipmen wit

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ALCONOX, INC

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Whether the job calls for cleaning avy duty tanks of metal, plastic and glass lined, or cleaning general equipment, Alconox combines power with the gentleness that spells SAFELY CLEAN.

Compounded from numerous different chemicals Alconox is blended into a fast acting multiple cleaning detergent that meets your cleaning needs every time—and at 21/2 cents per gallon.

Used by leading industrial firms who found it better for such varied s as cleaning ball bearing assemblies, optical lenses and industrial glass piping systems, after recommendations by their own research departments.

### outsells because it outperforms

your nearest

ACONOX, INC., 61-63 Cornelison Ave., Jersey City 4, N. J.

When inquiring check CP 7619 opposite last page

### Container fits the part - packaging concept in foamed plastic

no other wrapping, padding necessary

A packaging concept introduced at the recent Packaging Exposition in Chicago is exemplified in a container which exactly fits the parts it holds. Delicate items (vials of pharmaceuticals, for instance) can be snugly cushioned in this strong,

unit package. Design permits package to be taped, labeled, and mailed or shipped with no additional padding, wrapping, or outside protection.

For industrial packing and shipping, this concept eliminates expense of padding and wrapping products needing extra protection. As a further convenience, custommolded travs of the plastic material can be used for in-plant material handling. Then trays holding

Delicate goblet fits exactly into package. No further protection is needed. Package is merely taped together (lower right), labeled, and shipped without damage

products can be stacked and taped together.

Packages (or material handling trays) are made from Dylite expandable polystyrene foam which is completely water resistant. Inside material of package is relatively soft, providing a cushion. Outside of package is tough and hard. Each package is custommolded for the item it is to protect and can be any shape or color.

(APM foamed-plastic package is a development of Ambassador Plastics & Mfg. Co., Dept. CP, 620 N. Michigan Ave., Chicago 11, Ill. . . . or for more information check CP 7620 opposite last page.)

### Permits use of ordinary paper as labels on polyethylene

Recently developed peelable adhesive for polyethylene makes it possible to adhere any paper label to polyethylene items.

(Rubbatex peelable adhesive for polyethylene is a product of Rubba, Inc., Dept. CP, 1015 East 173rd St., New York 60, N. Y. . . . or for more information check CP 7621 opposite last page.)



Bemis Multiwalls made with RUF-GRIP kraft handle easily ... and stack easily ... and stay stacked. Consequently, they ship and store better. Get the details from your Bemis Man.

\* TRADE-MARK

Also in the Bemis Family, Serving the Chemical Industry . . .

Waterproof (Laminated) Bags

Sales Offices in Principal Cities



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### Universal Series" METAL DETECTOR

The new Dings Universal Series Metal Detector will detect the presence of all magnetic metals in materials that pass through the Detector Search Coil. Metals are thus detected in material in any form, whether in raw or finished conditions, in bulk or pressed form, liquid or viscous, granular or fibrous state. Even weakly magnetic metals such as manganese steel can be detected by this new, adjustable intensity unit.

Extremely simple in design, installation and operation, the new Dings Metal Detector requires virtually no attention. It is merely necessary to plug the unit into any single phase outlet, place the Search Coil around conveyor belt, and turn on the switch . . . and you have provided protection against tramp metal damage to machinery and product quality at an extremely low cost.

### HERE ARE SOME OF ITS OUTSTANDING FEATURES

- Wide range of sensitivity settings
- Responds to manganese steel
- Remote location of control cabinet (30-ft. of cable
- Permanent stability (no adjustments necessary—not subject to temperature or humidity changes)
- Rubber-mounted search coil completely water-tight
- Control relay inside cabinet (for actuating alarm systems, reject devices, motor starters, etc.)
- Low power consumption
- Easily installed and operated, even by inexperienced personnel

Write for literature.



### DINGS ELECTRONICS, INC.

DINGS MAGNETIC SEPARATOR CO.) 4731 West Electric Avenue Milwaukee 46, Wisconsin

MD15524

When inquiring check CP 7623 opposite last page

PACKAGING

Shipping expense cut by repainting used cartons . . .

> savings of \$25 to \$300 per 1000 cartons reported

Uses: Tan carton paint is used for repainting corrugated cartons, enabling their re-use. Paint can also cover up mistakes in shipping information, model number, or make of a product marked on the carton.

Savings of \$25 to \$300 per thousand cartons, depending upon their size and construction, have been reported when old lettering or entire cartons are painted for re-use.

Description: Tan carton paint dries to a permanent finish in 20 minutes, has no painty odor, and is non-flammable. It comes ready-to-apply with brush or roller. Paint sprayer is recommended for mass repainting. (Tan carton paint is a product of Luminall Paints, A Division of National Chemical & Mfg. Co., Dept. CP. 3617 S. May St., Chicago, Ill. Check CP 7624 opposite last page.)

### Ammonia now packaged in "metal bottle" . . .

light weight of convenient can saves shipping costs

Household ammonia is now being marketed in metal cans by the Sunlight Chemical Corporation of Phillipsdale, R. I. These tinless, non-drip, 22-ounce "metal bottles" are similar to the cans developed for liquid detergents.

Sunlight Chemical has found that while the cost of the "metal bottles" is slightly higher than a glass container, there is a considerable savings in shipping due to its light weight.

(Non-drip "metal bottles" are products of the American Can Company, Dept. CP, 100 Park Ave., New York, N. Y. . . . or check CP 7625 opp. last page.)



# BAG CLOSING problems

SEND for this new BULLETIN No. 201 which illustrates and explains how Union Special Suspended Head Bag Closing Machines can supply the answer to bag closing problems in small plants and large operations. Don't handicap your production with equipment that has limited capacity!

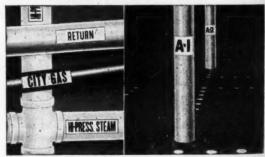
Union Special Bag Closers are designed to handle bags of heavy weight as well as light weight materials. These units are portable. Delivered to you complete with integral motor, thumb controlled clutch, automatic brake-ready to hang up, plug in, and go to work.

Send for this new Bulletin No. 201 NOW!

### 442 N. Franklin Street Chicago 10, Illinois

When inquiring check CP 7626 opposite last page

# **Self-Sticking Markers Cut Maintenance Time and Costs**



Self-Sticking Markers which cut maintenance time and costs are available from the W. H. Brady Co., Milwaukee. One of their widely-used products, ALL-TEMPERATURE PIPE MARKERS, stick permanently to pipes as hot as 300°F. Millions of them in use in plants of all types today. They conform to ASA standards and give you a fool-proof, cost-cutting method of pipe identification. Write for Bulletin No. 135-B.

Brady Self-Sticking DOTTED LINE AISLE MARKERS offer a fast, low-cost way to mark aisles. They are so tough they outween painted lines 5 to 1. Miles and miles of aisles are marked with these markers in plants everywhere. Write for Bulletin No. 141.

A quick, economical method for marking areas, bays, posts, b pallets, etc., is found in Brady Self-Sticking All-Purpose NUMBERS and LETTERS. These individual NUMBERS and LETTERS let you make up any combination of markings right on the spot. Stocked in six sizes, these handy Markers fit many plantwide Marking needs perfectly. Write for Bulletin No. 165.

Manufacturer: W. H. Brady Co., 757 W. Glendale, Mitwaukee 12, Wis

When inquiring check CP 7627 opposite last page

CHEMICAL PROCESSING

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use Taylor-Stiles No. 700

### PELLETER

This new pelleter cuts plastics extruded in rod form into evenly sized pellets without fines or longs.

The cuts are clean and free from feathers. The a machines are made in two sizes, 53/4" and 10" in width.

It has up to 30 fly 000 knives and may be operated at speeds that 0 will produce 5,760,000 0 pellets per minute. DD D

D Write for four page folder. 00



Riegelsville, N. J.

When inquiring check CP 7628 opposite last page

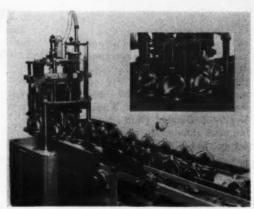
Filling of any size container possible without changing feed setup . . .

> unit is fully automatic, gives production speeds to 75 containers per minute

Filling containers from fractional ounce Uses: to 16 oz sizes, in various shapes.

Features: Feed arrangement of unit permits filling of containers of any shape or size.

Description: Feed arrangement of miniature rotary filling unit consists of a series of flat plates mounted on a chain. Containers are fed onto these plates and are carried under filling nozzles by



Feed arrangement of filling unit consists of a series of flat plates mounted on a chain

moving chain. Since plates are permanently synchronized with filling nozzles, all stars and guides are eliminated and any shape or size of container is accommodated. Production speeds up to 75 containers per minute can be obtained.

(Liquid filling machine is a product of MRM Company, Inc., Dept. CP, 191 Berry Street, Brooklyn 11, N. Y. Check CP 7629 opposite last page.)



"Mr. Jones, there's someone here with a complaint about the bagging machine."

### **Avery pressure-sensitive Labels** easy and fast to use -and they're priced right!

Here's fast, clean, economical labeling. All waste motions are eliminated-for unlike ordinary labels, Avery pressure-sensitive Labels are applied dry. One simple motion-a fingertip pressure-and Avery pressure-sensitive Labels are on in an instant...without moistening! Clean, easy application even on hard-to-label surfaces...they won't dry out, pop or peel...and they stay neat and attractive even under temperature and humidity extremes.

"what a <u>difference</u> they make — in every department!" PRODUCTION LABILING SIMPLIFIED WITH NEW AVERY "55" ELECTRIC DISPENSER Even more labeling efficiency is now available with this new Avery "55" Electric Dispenser. Every time one label is used, another pops out-automatically! No matter how fast, this new dispenser easily keeps pace with labeling operations including speed ups and delays-without adjustment-actually pays for itself with time and money saved! DID YOU KNOW? ..... that Avery originated pressuresensitive labeling back in 1935?

> problems of many industries, is at your service to help you develop a low-cost, economical labeling operation. There's no obligation...just explain your problems to your Avery representative - write or call the nearest Avery office listed in the yellow section of your telephone directory! Kum Kleen

KUM-KLEEN when you want a REMOVABLE label.

The benefit of years of experience

in solving the requirements and

PERMA-GRIP when you want a PERMANENT label.

	Send me free samples and information on Avery Pressure-Sensitive Labels.
--	--

AVERY ADHESIVE LABEL CORP., Custom Div. 123 1616 S. California Ave., Monrovia, Calif. 117 Liberty Street, New York 6 608 S. Dearborn Street, Chicago 5

our business is

When inquiring check CP 7630 opposite last page

# Automated



LIQUID compounding packaging accounting

Blends two or more liquids in preset proportions, automatically, in closed, continuous production. Highest possible accuracy. May be integrated with packaging and accounting for automated production. Write for "BLENDING" folder.







Repeating dial delivers predetermined, repeating quantities automatically. Predetermining dial delivers quantities up to 10,000 gallons, then shuts off. Recording printer on meter prints quantity dispensed or received for accounting.

BOWSER R

BOWSER, INC., FORT WAYNE, IND.

1315 E. CREIGHTON AVE.

When inquiring check CP 7631 opposite last page



Clean, thorough particle-size separations on most dry powdered, granular, flake, or crystalline materials; big capacity in minimum floor space and head room; and dustight, sanitary operation mean better sifting or grading with the BAR-NUN Rotary Sifter.

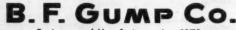
Exclusive 4-point drive moves entire screen area in complete, single plane rotary motion—eliminates flexible supports for sifter box. All-metal box is quickly opened

for easy cleaning or removal of sieves. Precision construction and balancing uses less power and contributes to long life and low maintenance costs. Users claim outstanding operating economies and advantages.

Available in several sizes, for single or

Available in several sizes, for single or multiple separations. A choice of sieves and sieve frames meets a wide variety of requirements. Location of outlets optional to meet plant material flow requirements.

Complete Information and Recommendations for Any Sifting Job on Request
FEEDING · MIXING · SIFTING · GRINDING · WEIGHING · PACKING
and PACKAGING EQUIPMENT FOR THE PROCESS INDUSTRIES



Engineers and Manufacturers since 1872 — 1344 S. Cicero Avenue, Chicago 50, Illinois

When inquiring check CP 7632 opposite last page

### PACKAGING

# Controls glue viscosity continuously and ends preparation problems

Designed for use in case-sealing operations, glue preparing machine is also expected to be applied where viscosity control is a factor of quality control of a mixture.

Automatic units mix dry or heavy liquid adhesives with water and maintain a constant viscosity and controlled-volume of adhesive output. Where desired, adhesives can be piped from the machine through a closed circulating system to carton or case sealers.

(Visco-Mat automatic glue preparing machines are a development of Triangle Package Machinery Co. of Chicago, and are manufactured and sold by Deshler Foundry & Machine Works, Dept. CP, Deshler, Ohio . . or for more information reader may simply check CP 7633 on handy Reader Service slip located opposite last page.)

### Lower hazard rating for aldrin, dieldrin

As a result of the safe-use record established by aldrin and dieldrin, the Pesticides Regulation Dept. of the USDA now permits lower hazard classifications for products containing these compounds. Milder warning and precautionary statements on product labels are permissible.

Products containing 10 through 59% aldrin or dieldrin, which include most commercial formulations, are now placed in the lower hazard category requiring the mild signal word "Warning" on the label. Another relaxation is substitution of the term "Hazardous" in the warning statement for "Poisonous".

Aldrin and dieldrin products below 10% may now be labeled "Caution" rather than "Warning".

(Information courtesy of Shell Chemical Corp., Dept. CP, 50 W. 50th St., New York, N.Y.)



# What's a "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem.

In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

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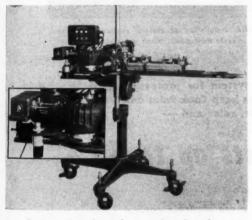
Cellophane or polyethylene bags code-dated by automatic unit on rotary sealer . . .

no effort to switch from coded to uncoded bags and vice versa

Code-dating attachment, designed for company's rotary bag sealing machines, works on polyethylene or cellophane bags.

Unit consists of a double trip mechanism actuating two solenoids, an ink reservoir with wick applicator, an ink transfer roller, a type drum, a solid backing bearer, and a font of bags lock type.

As bag goes through machine it actuates first trip switch and solenoid, which causes only that type to be inked which will come in contact with that particular bag. As bag travels further through machine and is between type drum and back bearer, it actuates second trip and solenoid, which causes backing roller to be in bearing position only during time code is being applied.



Bags actuate coder as they pass through machine

To put entire coding attachment out of operation, it is only necessary to press master switch of coder, rotate reservoir out of position, and cap the wick.

(Code-dating attachment and rotary bag sealing machines are products of Amsco Packaging Machinery, Inc., Dept. CP, 31-31 48th Ave., Long Island City 1, N. Y. . . . or check CP 7634 opposite last page.)

For more that's new in packaging . . .

check the handy product directory (pages 214 to 217.) All the latest products, services, and ideas presented in this issue are listed.



Monel drums into truck at a California plant. Ten gallon Monel drums are easily handled by one man, singly or on pallets.

The low-cost way to move corrosive chemicals and protect purity is to...

# ship in Monel or Nickel Drums

One of the most troublesome things to ship economically is a few hundred gallons or so of a poisonous liquid corrosive or a purity-sensitive chemical. Ordinary shipping drums are out of the question. Glass bottles require too much individual handling. Lined drums may crack or peel under rough handling.

Here's how several industries solved this problem:

The makers and users of liquid bromine used to employ glass bottles or lead-lined drums. Both were unsatisfactory. The bottles needed careful packing, had excessive tare weights and, of course, broke easily.



Now they ship dry bromine in Monel drums...solid Monel drums like this Hackney drum. The Monel drums satisfactorily resist corrosion, weigh a third as much as the lined drums and a fifth as much as the case of glass bottles.

Manufacturers of corrosive phosphorus compounds formerly used 55-gallon lined drums that weighed 330 pounds empty. Now they use solid Nickel drums weighing 190 pounds less. Think what that saves in labor and freight.

A maker of benzyl chloride once had to add an inhibitor to his product before it could safely be shipped in iron drums—then remove it again. Now he ships in nickel drums and his product stays clear, colorless and free of contamination.

This type of container has also been found adaptable for many other chemical and food products, including those where purity is of primary concern.

### What about cost?

A Monel or nickel drum actually costs less than the heavy lined containers. However, even where the initial cost is higher, the long life and Nickel drums made by PRESSED STEEL TANK COMPANY

- Top and bottom halves of drum formed as single pieces.
- High strength circumferential welded center seam.
- Seamless chimes eliminate corresionbreeding crevices.
- 4. Shock absorbing foot and stacking

(Available in 15, 20, 30, 55 and 110 gal, sizes.)

and greater durability of the nickel alloy container usually reduces the per-trip cost below that of other types. And having the product arrive in a non-breakable, purity-protecting container reduces the problem of customer complaints.

For exact prices, ICC specifications and information on suitable applications of Monel and Nickel drums, write The Pressed Steel Tank Company, 1447 South 6th Street, Milwaukee, Wisconsin.

The International Nickel Company, Inc. 67 Wall Street New York 5, N. Y.



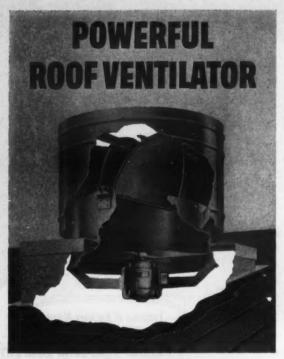
**NICKEL ALLOYS** 

Monel

...for minimum

When inquiring check CP 7635 opposite last page

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# SKY-BLAST

2820 to 78800 CFM Certified Air Delivery

This powerful roof ventilator with famed airfoil propeller scoops up heat, moisture, dust, fumes... blasts them high into the outside air. Powered by Robbins & Myers All-Weather Motor, the Propellair Sky-Blast is dependable, economical, efficient and maintenance-free.



### SKY-BLAST FEATURES

- Constant performance regardless of winds
- · Easy to install on all roofs
- Patented leak-proof automatic butterfly damper assembly
- Rugged all-steel galvanized construction
- Low silhouette for minimum roof stress
- Backed by more than 20 years of research and engineering

Write for Bulletin 680-C



When inquiring check CP 7636 opposite last page



Before central metering system was installed, batch blending of paint was a messy, costly job



After installation of meters, production jumped, costs went down, plant was cleaner, safer

Switch to an exact metering system for processing high quality paint products helps keep Cook Paint and Varnish Company cleaner, safer and —

# reduces mixing costs up to 50%

Closed system provides easier, more accurate control while minimizing evaporation and oxidation losses

WILLIAM A. KELLAR, Supt.
Cook Paint and Varnish Co.
Kansas City, Missouri
with ROY G. HELSING, Assistant Editor

Problem: Manual method formerly employed by the Cook Paint and Varnish Co. of Kansas City, Mo. to blend paint ingredients prior to mixing was subject to error and costly from the labor standpoint. Liquid components were weighed on portable or fixed scales, which introduced several possible human and mechanical errors into the operation. These liquids were then hauled "by hand" in portable tanks to the mixers and reducing tanks where they were transferred with port-

able pumps.

This "hand-method" of blending also created maintenance problems, in that it was messy, and safety problems, because paint ingredients were constantly exposed to the atmosphere, which became laden with fumes.

Solution: About a year ago, Cook Paint and Varnish installed a metering system, comprised of six Xacto meters, to measure ingredients for each paint batch. These meters are designed to give positive displacement accuracy on liquid measuring jobs.

Each meter is equipped with a pre-determining adapter which is preset for amount desired and which shuts off flow automatically when that amount has been delivered. Each also has a recording printer dial which prints the actual num-

CHEMICAL PROCESSING

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ber of gallons delivered in each operation. For long wear and resistance to corrosives, working parts of meters are stainless steel with hard carbon bearings and Teflon pistons.

Batches made with the Xacto Meter System very seldom require any adjustment. Costs for mixing and blending have been greatly reduced (in some instances up to 50%), production is faster and product quality better. Need for maintenance has been cut down. Centralized installation permits easier and quicker control.

The closed system is safer in its operation and minimizes evaporation and oxidation losses since there is no exposure of materials to the atmosphere. Accuracy of control is assured by verified printed records.

(Xacto Meters are products of Fort Wayne Div., Bowser, Inc., Dept. CP, Fort Wayne, Ind. . . . or for more information check CP 7637 on handy form opposite last page.)

### Silicone lubricant operates at temps of 400°F and higher

thermal operating range also goes to -100°F

Especially adapted for use in such typical "hot" industries as glass, steel, ceramics, petroleum, and aircraft. Lubricant's performance is effective in "steel on steel" use, and it is applicable to most industrial purposes.

Lubricant's thermal operating range is from minus 100 to over 400°F. It combines the lubricating qualities of hydrocarbon with the properties of silicones.

Description: Silicone lubricating fluid and lubricating grease are developmental products, expected to be available commercially during this year. They lubricate about as effectively as both the lubricating and hydraulic-types of hydrocarbons. They are expected to reduce maintenance costs as well as increase reliability of operating equipment.

Both the lube fluid and grease show little change in viscosity or consistency at high temperatures, and resist shear breakdown.

(High-temperature silicone lubricants — 81406 fluid and 81482 grease - are products of Silicone Products Department, General Electric Company, Dept. CP, Waterford, N.Y. . . . or for more information check CP 7638 on handy form opposite last page.)



Tube sheets at 4-spindle automatic drill in Braun shop.

C. F. Braun & Co., Alhambra, Calif. is well known in the petroleum industry, the chemical industry, and other businesses in which heat transfer and fractionation are vital. Revere Copper and Brass Incorporated is well known in the non-ferrous metal industry for its tube sheets and plates, in all the customary alloys. What is more natural than the close relations between the two companies, Revere the supplier, Braun the fabricator? Revere can furnish heavy plates when needed; Braun is one of the great heavy-duty shops of the country. So far as transportation limits permit, Braun fabricates in its own plant; their machines and their cranes can handle anything the railroads can haul away. The same is true of Revere, which is likewise known throughout heavy industry for its ability to produce not only large plates, but also condenser and heat exchanger tubes.

Revere is pleased to be an important supplier to Braun. Remember, good names find it good business to come together. The next time you want quotations on tube sheets and plates, and condenser tubes, get in touch with the nearest Revere Sales Office.

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801 230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich. Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N.Y. Sales Offices in Principal Cities, Distributors Everywhere.

A Braun engineer inspects a drilled tube sheet



When inquiring check CP 7639 opposite last page

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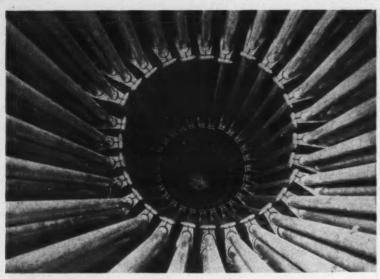
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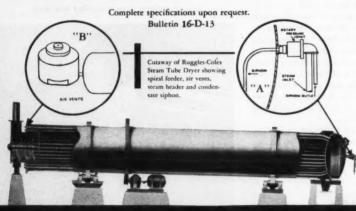
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# Ruggles-Coles STEAM TUBE DRYERS

- Ruggles-Coles Steam Tube Dryers have been supplied fabricated of aluminum, nickel, monel, inconel, stainless steels and other alloys to provide protection against corrosion and contamination. All fabrication is to code requirements.
- The continuous siphon discharge of condensate is independent of speed of rotation of the shell. (See "A")
- Automatic air vent for each tube eliminates loss of tube heating surface at the feed end of the dryer. (See "B")
- These extra advantages of the Ruggles-Coles Dryer mean continuous maximum output without operating attention and elaborate control devices.



### HARDINGE COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

When inquiring check CP 7640 opposite last page

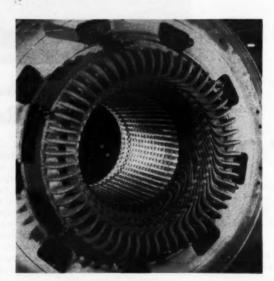
### **ENGINEERING & MAINTENANCE**

Efficiency of large generators and motors increased by use of silicone rubber . . .

all-rubber insulation system imparts maximum resistance to moisture, shock, fatigue

All-silicone-rubber insulating system for large motors and generators has been developed and is available on company's units in the 2300 and 4000 volt insulation classes. Insulating system increases life and efficiency of units by offering increased heat, moisture, and abrasion resistance, more flexibility and resilience, greater chemical inertness, and improved heat dissipation.

Material used in this insulation system is made from a pure silicone rubber gum compounded with silica. It is made by burning silicon tetrachloride in the presence of combustible gases. As a filler for silicone rubber, it imparts maximum strength and tear resistance, and contributes to a combination of electrical properties that approach those of quartz.



Stator for 2500-hp, 2300v, 3580-rpm squirrel-cage induction motor with all-silicone-rubber insulation

Insulation made from this material is applied to the entire coil structure of motor or generator and then vulcanized to form a homogeneous, void-free dielectric barrier. Built-up layers of dissimilar materials and binders are eliminated.

As a result of the availability of silicone rubber insulation, motor application practice is expected to change in a number of industries. Some applications that formerly required totally-enclosed frames may now be handled with semi-protected or open-type frames. This trend may be expected in the chemical, paper, food, and other industries where the moisture-impervious and corrosion-resisting qualities of silicone can be exploited.



# IMMEDIATE DELIVERY

from the World's Largest Stock
CHROMALOX

**Electric Heaters** 

Chromalox offers you prompt service from the world's largest factory stock of industrial electric heaters . . . over 15,000 types, sizes and ratings. Local stocks at points throughout the nation.

There is a specific Chromalox Electric Heater to heat liquids, air and gases. For heating platens, dies, molds, moving metal parts . . . anywhere you need fast, clean, economical and easy-to-control heat up to 1100° F.

Let the Chromalox Sales-Engineering staff solve your heating problems . . . electrically

# Write for your copy of Catalog 50

Contains information on complete line of Chromalox Electric Heaters, elements, thermostats, contactors and switches. Gives uses, construction information and prices, plus basic heat calculation data and heat loss charts.



For ideas on additional applications of electric heat, request Booklet F1550—"101 Ways to Apply Electric Heat." Write teday.

### Edwin L. Wiegand Company 7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania

7517 Thomas	Boulevard, Pittsburgh 8,	Pa
Please sen	d me Catalog 50	
Please sen	d me "101 Ways"	
☐ Have a Sa	les-Engineer contact me.	
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When inquiring check CP 7641 opposite last page

CHEMICAL PROCESSING

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(Motors and generators all-silicone-rubber insulated by the Silco-Flex system are products of Allis-Chalmers Manufacturing Co., Dept. CP, 1151 S. 70th St., Milwaukee 1, Wis. . . . or for more information check CP 7642 opposite last page.)

(Silastic silicone rubber, upon which Silco-Flex insulating system is based, is a product of Dow Corning Corporation, Dept. CP, 592 Saginaw Rd., Midland, Mich. . . . or for more information check CP 7642A opposite last page.)

# Adjustable damping is featured on machinery mounts . . .

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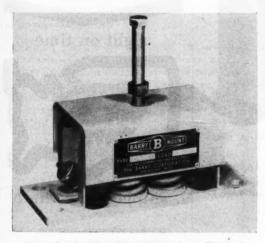
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SSING

excessive machine motion or bounce due to heavy shock can be checked

Uses: Where high absorption of vibration is necessary or where soft floors make control of vibration frequencies difficult.

Features: Mount has an adjustable damping feature. Simple damping adjustments can be made to prevent sudden spring recoil when a mount is subject to heavy impact and shock and when mounted unit goes through resonance, thus checking excessive machine motion or bounce.



Mount has built-in adjustment permitting 3/4" level

Dampers are faced with friction brake linings, acting on steel surfaces, which dampen horizontal as well as vertical forces.

Description: Machinery mounts are available in five sizes, with 1, 2, 4, 6, or 9 springs. Depending on size, mounts have an effective load range of from 250 to 6700 lb per mount. Since there is no need to bolt or shim when machines are mounted on these units, they can be installed and leveled in minutes. (Spring mounts are products of The Barry Corporation, Dept. CP, 1000 Pleasant St., Watertown, Mass. . . . or check CP 7643 opposite last page.)



"Buffalo" builds anything and everything you need in the fan and blower line. Big ventilating

Pressure Electric B

required for special applications.

The smallest "Buffalo" Breezo Propeller Fan delivers as little as 500 cubic feet per minute and fans of this type range in size up to 144" diameter.

In between these two are Industrial Exhausters—

fans in our standard sizes deliver up to one half

million cubic feet per minute, and more if

Pressure Blowers — Mechanical Draft Fans — Electric Blowers—Exhausters—Axial Flow Fans — Belted Vent Sets — Baby Vent Fans — HVA Heating and Ventilating Units — all built to the high standards of the famous "Q" Factor\* which has given "Buffalo" users more for their money for 78 years.

Write us about your air needs. You need look no further than "Buffalo" for the best solution.

\*The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.



### **BUFFALO FORGE COMPANY**

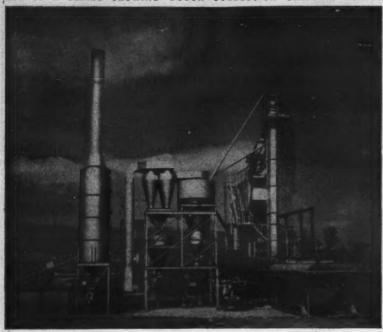
524 BROADWA

BUFFALO, N.Y.

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives In All Principal Cities

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

When inquiring check CP 7644 opposite last page



# DUST RECOVERY and CONTROL

save a mountain of usable product fines

At normal production rate, this typical installation of the Ducon Cyclones and Centrifugal Wash Collector will pay for itself in short order. These special Ducon "package" units are teamed to provide maximum recovery and dust control for Rotary Dryer Operations. Type LD and SD Cyclones recover, at high efficiencies, usable product from the exhaust gases in the dry state. One of several types of Ducon Washers, employed for final stack clean-up, remove the extreme fines and discharge clean gas to the atmosphere. Washing liquid can be re-circulated to effect complete recovery of all material processed. Perhaps your dust collection problem has a parallel among the many we have already solved in the 20 years of our specialization.

Write for descriptive literature.



Canadian Branch: THE DUCON COMPANY of CANADA, Ltd. 275 James Street North, HAMILTON, ONTARIO

COMPANY

147 EAST SECOND STREET, MINEOLA, N.Y. . Sales Representatives in Principal Cities

Designers and Manufacturers of Dust Control Equipment Exclusively

CYCLONES . CENTRIFUGAL WASH COLLECTORS . TUBULAR CLOTH FILTERS . DUST VALVES

When inquiring check CP 7645 opposite last page

### **ENGINEERING & MAINTENANCE**

### Maintenance control discussed

Assured equipment productivity through maintenance management is the subject of eightpage bulletin. Five requirements for an effective maintenance control system are outlined. Necessary records are discussed and automatic machines for simplifying record-keeping are pictured.

"Maintenance Management" is available from Remington Rand Inc., Dept. CP, 315 Fourth Ave., New York 10, N.Y. When inquiring specify CP 7646 opposite last page.

Ends water hammer in pipelines, won't leak or wear out . . .

insert and tube in unit return to original shape after distorting force is past

Uses: To end problem of water hammer in pipe lines.

Features: Unit is so designed that it will permit molecular displacement with assurance that it will

regain its original form immediately after distorting force is removed.

Description: Shock absorber has milled insert and compression molded tube in steel shell. Tube and insert never reach elastic limit regardless of shock to which subjected. Thrust and impact of water entering tube expands it against insert until energy caused by pressure is dissipated. As shock recedes, tube and insert regain form.

Leak-proof shock absorbers are available in sizes from ½ to 2".

(Shock absorbers are products of Dept. SA6, Josam Manufacturing Company, Dept. CP, Michigan City, Indiana . . . or check CP 7647 opposite last page.)

Fast, accurate response offered in DC motors of standard design . . .

acceleration time to full speed has been cut in half by unit

Uses: For high-speed, accurately-controlled DC motor applications.

Features: Units in DC line are rugged, able to take full loads and overloads, will change speeds rapidly, maintain torque and tension, reverse and stop quickly. Time required for units to accelerate to full speed has been cut in half.

### LITTLEFORD

STAINLESS STEEL
AND ALUMINUM
FABRICATED PRODUCTS

FOR THE

# CHEMICAL

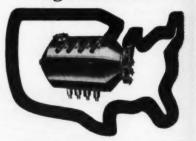
INDUSTRY



made right



right on time



### shipped anywhere

Littleford fabricates tanks, bins, vats, troughs, carts and special units... from stainless steel, aluminum, nickel, Monel or other non-corrosive metals. Matches your design with precision accuracy. For prompt service at low cost, rely on Littleford, fabricators of plate and sheet metal products for industry since 1882. Send us your blueprints for prompt estimates.



When inquiring check CP 7648 opposite last page

CHEMICAL PROCESSING

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Motor enclosures are available for all operating conditions

Description: These standard DC motors are available in sizes from 20 to 100 hp. A complete range of mechanical enclosures is available to assure protection under all operating conditions.

(Super 'T' Line DC motors are a development of Reliance Electric & Engineering Co., Dept. CP, 1088 Ivanhoe Road, Cleveland 10, Ohio . . . or for more information check CP 7649 on handy form opposite last page.)

# Illustrated guide to selection of engineering irons

Valuable characteristics of nickel cast irons are presented in 28-page basic reference bulletin. Fifty illustrations indicate wide industrial usage in all sizes and shapes. Twenty-seven tables, charts, and photomicrographs show how engineering properties of cast iron can be controlled to meet service requirements through use of nickel.

Bul A-69 is available from The International Nickel Company, Dept. CP, 67 Wall Street, New York 5, N. Y. When inquiring specify CP 7650 on handy form opposite last page.

> THAT'S INTERESTING

Forty miles of highway on a barge

A new barge operating between Baltimore, Md., and ports on the New York State barge canal and the Atlantic coast, is capable of carrying a cargo of hot asphalt sufficient to build a two-lane highway 40 miles long. Built by the Wiley Mfg. Co. at Port Deposit, Md., the 240-ft long craft has the capacity of seven railroad tank cars.

# Are your valves over their heads in corrosive reducing solutions?

Switch to Aloyco Monel or Nickel Valves!



ALOYCO MONEL VALVES are used extensively in handling alkalies, salt waters, food products, organic substances, and many air-free acids.

Keeping corrosive solutions of mineral and organic acids, alkalies and salts under control is a job for Aloyco Monel or Nickel valves.

Monel valves are especially good for handling hydrofluoric acid which is used as a catalyst in one process for the production of high octane gasoline. Monel and Nickel have exceptional resistance to neutral and alkaline salt solutions, including chlorides, carbonates, sulfates, nitrates and others. Nickel is more resistant than Monel to more concentrated NaOH solutions at elevated temperatures and is usually preferred when

contamination of the caustic with copper or iron would be objectionable.

Nickel, although similar to Monel in corrosion resistance, has generally an inferior resistance to acids, about the same resistance to salts and a little better resistance to alkalies.

Both alloys are available in a wide range of Aloyco valve designs. They're cast by induction melting at Aloyco foundries and machined in Aloyco plants. New bulletin #9, couponed below, provides complete information. Write today to ALLOY STEEL PRODUCTS CO., INC., Linden, N. J.



	Elizabeth Avenue
Linden, Ne	w Jersey
	Gentlemen:
	Please send me a free copy of your Bulletin No.
	on Monel and Nickel valves.
Name	
Name	
Name	

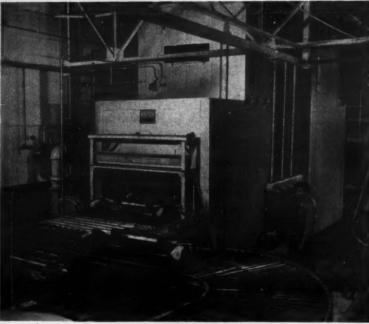
When inquiring check CP 7651 opposite last page

### for a NEW PRODUCT and a NEW PROCESS



again employs a modern

# ROSS OVEN



Moulds entering ROSS gas fired oven on mechanical conveyor

### for continuous type curing of FIBERGLAS moulded parts

From their past experience with the performance of ROSS ovens, OWENS-CORNING FIBERGLAS CORP. again chose ROSS equipment to achieve the exact curing results required for a new product recently developed. Here is another example of how ROSS' long experience is being utilized to insure proper solution of entirely new processing problems. Leading manufacturers rely upon recommendations by ROSS. Write for Bulletin S. 3.

CORPORATION

Main Office: 444 MADISON AVE., NEW YORK 22, N. Y. Atlanta • Boston • Chicago • Detroit • Los Angeles • Seattle

> ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL, CANADA CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

When inquiring check CP 7652 opposite last page

### MAINTENANCE

### Moderately-priced unit cuts boiler costs during summer . . .

eliminates use of main boiler

Uses: Where process steam requirements call for an efficient, moderately-priced boiler in the lower horsepower sizes.

Features: Use of gas-fired boilers, of exact hp required during warm weather, eliminates cost of operating a boiler having capacity many times requirements.

Description: Units are built for 100 psi, come equipped with safety valve. Controls can be adjusted to automatically maintain any desired working pressure below 100 psi. Boilers can also be supplied for pressures to 350 psi. (MKAYO gas fired automatic steam boiler is a product of Mears-Kane-Ofeldt, Inc., Division of S. T. Johnson Co., Dept. CP, Church Road, Bridgeport, Pa. Check CP 7653 opposite last page.)

### Just one turn of screw clamps pipe in vise

Company has recently announced a vise which automatically adjusts on pipe from 1/8 to 21/2", and clamps on it with less than one turn of screw. Other features of



vise include 3-way, long, toolsteel top jaw with milled teeth. Spring under self-locking hook keeps top jaw housing tight and level. Bottom jaws are reversible.

(Pipemaster vise is a product of Erie Tool Works, Dept. CP, Liberty & 12th Sts., Erie, Pa. Check CP 7654 opposite last page.)



When inquiring check CP 7655 opposite last page

545 West Abbott Street, Indianapolis 25, Indiana

Every Size - for Every Service

### **U-Type Manometers** • Single Cleanout

• Single Gland-Packed

Double Cleanout

Double Gland-Packed

and read • High Pressure

### Wei Type Manometers

• Low Well

• Raised Well

Barometric Reading | Easy to service

Low in price

Trouble-free

Easy to install

### **Multi-Tube Manometers**

 Multi-Well Special-Purpose

• Common-Well

FREE LITERATURE gives sizes, construction and prices. Write today! And ask for

informative 12-page Manual on Manometers. KING ENGINEERING PRODUCTS include King-Gages — Manometer
Clesing Push Valves — Pressure Transmitters — Sight Feed But
Overflow Check Valves — Air-flow
— Sediment Traps — Moisture



When inquiring check CP 7656 opposite last page

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### Complete data on vertical pumps

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Authoritative reference book for the vertical turbine pump industry discusses pump selection for hot, volatile, viscous, and corrosive fluids, applications, engineering formulas and data. Development of ground water resources, geology, drilling methods, well logging, construction, design, and performance characteristics of vertical turbine, mixed-flow and propeller pumps are analyzed.

Carefully-indexed volume furnishes foundation upon which engineers, regardless of field, may base premises and evaluations of individual pumping problems.

"The Vertical Pump by Johnston" may be obtained by remitting \$10 the copy direct to Johnston Pump Company, Dept. CP, 3272 E. Foothill Blvd., Pasadena, Calif.

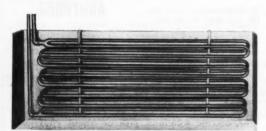
### Maximum heat transfer surface in limited space . . .

unit gives fast start in fluid heating service

Uses: High-speed heating of solutions in plating tanks, rinse tanks, cleaning tanks, caustic tanks, and for all general fluid heating service.

Features: Units have a maximum amount of prime heat transfer surface in a limited space. Cross sectional width is only 234". Staggered arrangement of tubes accelerates fluid motion by its high conduction and convection factor.

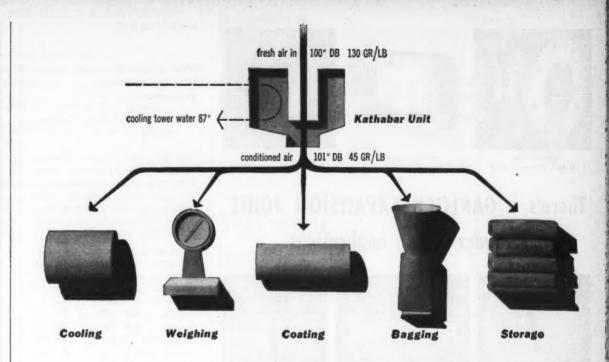
Description: Standard height of heaters is 31½". Lengths are made to requirement. Units are fabricated from full weight, bending quality wrought steel pipe and tested to 350 psi. For special applications heaters can be made of stainless steel, copper, aluminum, nickel, brass, or any ferrous or nonferrous metal.



Cross sectional width of heater is only 2-34"

Heat transfer coefficient for standard grid when heating solutions of water to boiling point is 800 Btu per degree TD, per hour, per lineal foot of length OA.

(Hi-Therm grid heaters are products of Rempe Co., Dept. CP, 340 N. Sacramento Blvd., Chicago 12, Ill. Check CP 7657 opposite last page.)



# HOW KATHABAR HUMIDITY CONDITIONING STOPS MOISTURE REGAIN IN AMMONIUM NITRATE

### using 87°F coolant to get 46°F dewpoint

You can prevent moisture regain in the production of hygroscopic materials—common problem in chemical industries—by taking a cue from major producers of ammonium nitrate. They use Kathabar humidity conditioning to bathe process areas with a protective atmosphere of dry air in equilibrium with their dried prills.

Before they applied Kathabar equipment to this problem, costly recycling was often necessary to restore proper dryness and avoid clogged conveyors and bagging machines, bricking up in storage, inaccurate bagging.

Ammonium nitrate producers selected Kathabar systems to solve these problems because of several operational advantages. Kathabar units are economical; can deliver air at 46°F dewpoint with 87°F cooling tower water. No expensive over-cooling and reheating. They're rugged: perform effectively with only routine maintenance in the extremely corrosive ammonium nitrate atmospheres. They're safe: absorbent solution is non-inflammable, will not carry over.

Kathabar units are doing similar jobs in many other chemical process industries such as pharmaceuticals, plastics, food, rubber, film, atomic energy. They can meet your exacting requirements, too—economically, effectively, safely. Call your Kathabar system engineer or write for Literature Group K54-3 to learn how this equipment can earn for you.



### SURFACE COMBUSTION CORPORATION . TOLEDO 1, OHIO

ALSO MAKERS OF Surface INDUSTRIAL FURNACES Jantirel AUTOMATIC SPACE HEATING

When inquiring check CP 7658 opposite last page

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**Rubber Expansion Joint** 



Rectangular-type **Rubber Expansion Joint** 

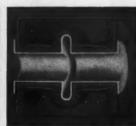


U-type **Rubber Expansion Joint** 

# There's a GARLOCK EXPANSION JOINT for your piping applications



All-Teffon' **Expansion Joint** 



**Rubber Expansion Joint** with Teflon liner



Expansion Joint for use on Hayes and Duriron piping

### To stop vibration, flange breakage

### To relieve stresses and strains in piping and equipment

Garlock manufactures a complete line of expansion joints specifically designed to meet the requirements of different types of service. Rubber Expansion Joints are made in all pipe sizes from 3/4" to 72" for water, air, or exhaust steam. They are furnished in round, rectangular, tapered or offset; spool-type and U-type.

All "Teflon" Joints or Rubber Joints with Teflon liner are made for chemical service; Neoprene Joints for oil service. Specially designed Rubber Expansion Joints are now available for use on piping and flanges made by Haveg Corp. and The Duriron Co., Inc.

Write today for Expansion Joint Folder AD-137.

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK Seles Offices end Warehouses: Baltimore \* Birmingham \* Boston \* Buffalo Chicago \* Cincinnati \* Cleveland \* Denver \* Detroit \* Houston Los Angeles \* New Orleans \* New York City \* Palmyra (N.Y.) Philadelphia \* Pittsburgh \* Portland (Oregon) \* Salt Lake City \* San Francisco \* St. Louis \* Seattle \* Spokane \* Tulsa. in Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.



\*The Du Pont Company's Trademark

PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS, RUBBER EXPANSION JOINTS

When inquiring check CP 7659 opposite last page

### MAINTENANCE

### Wide industrial usage seen for ultrasonic generators . . .

accelerate dyeing, brewing, tanning

Primarily intended for cleaning and degreasing precision metal. glass, and plastic products, ultrasonic generating equipment also descales heat-treated parts and accelerates dyeing of fabrics, brewing of beer, and tanning of leathers.

In cleaning operations, the glass detergent- or solvent-filled tank containing parts to be cleaned is seated on top of a magnetostriction transducer developing intense vibrations at an optimum cleaning frequency just beyond hearing range. Grit, chippings, and oils literally explode out of all parts of the work.

Groups of these transducers energizing larger tanks can be driven by economical motor-generator sets for cleaning jobs involving large assemblies and for application in the dye and beverage fields.

(Ultrasonic generator, Model DR-400, is a product of Acoustica Associates, Inc., Dept. CP, 421 Seventh Avenue, New York 1, 'New York . . . or for more information check CP 7660 on handy form opposite last page.)

### Illustrates burners for dryers

Burners for rotary sand and stone dryers and rotary calcining kilns are described and illustrated in six-page catalog. Photos show how these units, which burn oil or combination gas and oil, produce long, narrow flame and give greater transfer of radiant heat.

Capacities and dimensions are tabulated. Descriptive drawings are included.

Cat 414 is issued by Hauck Manufacturing Co., Dept. CP. 124-136 Tenth St., Brooklyn 15, N. Y. When inquiring specify CP 7661 opp. last page.



RELIABLE RELIEF VALVE!



· Doesn't leak

· Reseats dead tight

· Doesn't stick

Send for information today . . . . . . . . . . .

OTHER CIRCLE SEAL VALVES

. Check Valves

. Shut-aff Valves

Shuttle Valves



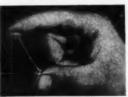
Representatives in Principal Cities.

AL precision valves

JAMES · DOND · CLARK 2181 East Foothill Boulevard, Pasadena 8, California

When inquiring check CP 7662 opposite last page

### WHAT PIPE JOINT COMPOUND WOULD YOU SPECIFY TO HOLD ...



Tacky enough to hold on to any type of surface

PERCHLORETHYLENE. TOLUENE. "FREONS" . ACETIC **ANHYDRIDE?** 

Leak Lock joint compound, with five years use in the chemical, refrigeration and aircraft industries, may be the answer to your "unsolvable" leaking joint problems.

Leak Lock has other unusual chemical properties . . . great adhesion and flexibility. It will resist almost everything except lower alcohols and caustic solutions. Ask us about your joint compound problems and request a sample.



HIGHSIDE CHEMICALS COMPANY 16 COLFAX AVENUE,

When inquiring check CP 7663 opposite last page

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# Chemical **Machinery Operation Improved**

Mr. E. J. Kelly, Sales Manager of C. E. Howard Co., manufacturers of storage tanks, agitators and pasteurizers for the chemical and food industries, gives these reasons for using Slo-Speeds on their equipment.

- 1. High efficiency of rugged, simplified, precision helical gear system.
- 2. Streamlined design for ease of cleaning.
- 3. Protected housing design.
- 4. Compactness of minimum installation space.
  5. Positive oil seals.
- 6. Low maintenance.

### STERLING SLO-SPEED



### GIVES YOU THE ONE BEST LOW SPEED AND

gives uninterrupted service - carries heavy overhung loads - provides versatile mounting and flexibility in arrangement of machinery - saves valuable space - provides greater safety -- costs less to install and use. An indispensable source of low speed power for:

Agitators Blenders Blowers Conveyors

Cookers

Dryers Feeders Kilns Mills

Presses Pumps Screens Tumblers Mixers Etc., etc.

20-page illustrated catalog... Sterling Speed-Trol, Slo-Speed, Klosd and Klosd-Tite Electric Power Drives. Write for catalog No. 204.

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santlago, Chile; Offices and Distributors in all principal cities

When inquiring check CP 7664 opposite last page

ENGINEERING & MAINTENANCE

Rotary mechanical shaft seal is in easily-replaceable cartridge assembly . . .

units designed for service in fluid mixing

Designed especially for service in fluid mixing applications.

Features: Seal is assembled in a cartridge as a single component. It can easily be uncoupled and removed, and replaced in just a few minutes without dismantling mixer or removing it from tank, and without emptying tank. Shaft alignment is automatic.

Through a locking collar arrangement it is possible to replace seal of a mixer that is entirely below the liquid level, or on a pressure vessel, without loss of product or pressure.

Description: Two seal assemblies are available. Single seal assembly is used in applications where sealing faces are lubricated by tank contents, and where service conditions are not severe. Double seal is applied to mixers where tank contents will not lubricate sealing faces, where they contain abrasives, or under conditions of high temperature or pressure.

Double seal assembly is available in types suitable for pressures ranging up to 1200 psig, and for temperatures ranging from -120° to 485°F. Materials include stainless steel, Stellite, bronze, ceramic, Hastelloy, and Teflon. Special designs can also be provided for other conditions of temperature, pressure, or other factors.

(Lightnin mechanical shaft seal is a product of Mixing Equipment Co., Inc., Dept. CP, 158 Mt. Read Blvd., Rochester 11, N. Y. . . . or for more information about this product reader may simply check CP 7665 on convenient Reader Service slip located opposite last page.)



### Your guide to more ideas concerning Engineering and Maintenance . . .

is the handy Product Directory on pages 214 to 217. All products and services discussed in this issue, in either editorial or advertising, are listed there. **FIGURES** 

You want long-lasting filter cloths with built-in resistance to chemicals and mildew



# GET 'EM FOR LESS WITH DYNEL

Tests in plant after plant prove that DYNEL filter cloths and matting last four or five times longer than traditional cloths . . . are unaffected by most chemicals, keep their size and shape, retain their high strength wet or dry, are mildewproof, won't support combustion.

YES, IT FIGURES. These qualities are built into DYNEL fiber to give you dependable, efficient performance. It saves you time, reduces your labor costs, cuts your operating expenses. See for yourself. Run samples of DYNEL filter fabrics or mats under the specific conditions in your plant. Write for list of manufacturers.

The fiber that figures in your future

Textile Fibers Department, Carbide and Carbon Chemicals Company A Division of Union Carbide and Carbon Corporation at 30 E. 42nd St., New York 17, N.Y.

When inquiring check CP 7666 opposite last page

NG

# Why is CONSECO EQUIPMENT more DEPENDABLE and ECONOMICAL?

Three vertical type, full fleating head Conseco Hot Water





# **CONSECO DESIGN** forestalls troubles

We know the trouble spots of practically every make of heat exchanger, condenser, evaporator, pressure vessel, and similar equipment on the market. Why?---because our maintenance division has been repairing, rebuilding, and modernixing equipment made by various manufacturers for many years.

Conseco engineers profit by the experience of our maintenance division in the design of Conseco equipment. They literally "engineer out" troubles. Thus you are assured of maximum operating efficiency and lowest maintenance cost.

Tell us the type of equipment you need, and we'll send you informative bulletins.

### SERVICE & ENGINEERING CO., INC.



161 Observer Highway HOBOKEN, N. J.

### CONSECO MAINTENANCE DIVISION

Conseco maintenance division has been repairing, rebuilding, modernizing, and maintaining equipment used in the power, chemical, refining, and marine industries for over a quarter century. Our highly mechanized field crews are supervised by qualified engineers and backed by specialized manufacturing facilities and ample replacement parts. Thus you are assured of fast, efficient results at lowest cost. Conseco service is as near as your phone.

Phone HOboken 3-4425 **BArclay 7-0600** For Service

ANY HOUR Day or Night

ANY DAY Including Holidays

ANYWHERE

On the Continent

When inquiring check CP 7667 opposite last page

MAINTENANCE

Cooling tower design eliminates effect of wind . . .

> no recirculation; operating efficiency improved

Representing a rearrangement of a standard tower's component parts, recently-announced cooling tower is said to offer advantages of improved operating efficiency by controlling recirculation, and increased functional life span with reduced maintenance requirements.

Tower can be located without respect to wind direction. Design nullifies effect of recirculation caused by tower structure upon itself. Uncontaminated air is allowed to pass freely beneath the structure and supply fans on both sides of the tower, with an excess of air discharging from tower's leeward side.

Mounted on an open substructure, tower and its redwood basin are supported by "cast-in-place" concrete piles. Design affords protection from costly vibration damage.

Forced draft fans, which are individually mounted on ground on either steel pipe columns or small concrete structures, are not connected to tower's structure. Fans are located outside packing area, discharging vertically in the external, vertical plenum area. They are placed so no harmful sunlight, rain, or hot vapors come in contact with blades or machinery.

("Wind-trol" cooling tower is a development of Santa Fe Tank & Tower Co., Inc., Dept. CP, 5401 S. Boyle Ave., Los Angeles 58, Calif. Check CP 7668 opposite last page.)

### Multi-V drive manual

Engineering manual of 100 pages presents details on multi-V drives and their components.

Book No. V-1400-E2F is issued by Mechanical Power Transmission Div., Worthington Corp., Dept. CP, Oil City, Pa. Specify CP 7669 opp. last page.

Ventilate CONFINED Places with Vano Design "C" Ventilator-Exhauster

Ideal for withdrawing welding fumes from confined places or directly from the welding rod. Provides greater safety, greater comfort for workers...leads to greater work efficiency. Can be furnished with 8" suction inlet to which 8" non-collapsible suction tubing may be attached...or provided with multiple inlet norsles for 5", 4" and 3" suction hose.

Other types are also available for supplying fresh air to men working in confined places, such as tanks, manholes, drums, boilers and shipholds.

Coppus Engineering Corporation 386 Park Ave. Worcester 2, Mass.



When inquiring check CP 7670 opposite last page

HES FROM A REACTOR KETTLE



DARLING VALVE & MANUFACTURING CO.



When inquiring check CP 7671 opposite last page

CHEMICAL PROCESSING

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### No hot spots are possible with drum warmer

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Design features of hinged-type automatic drum warmer are presented in two-page illustrated bulletin. Unit described has electric heating elements which are recessed behind expanded metal screen for protection against spillage and for safety. A 2" thick non-settling glass fiber blanket insulation all around prevents heat loss.

By using only radiated and convected heat no hot spots are possible, thereby eliminating charring or other contamination of drum contents. Thermostat gives positive control against overheating and allows safe overnight heating to provide drums at proper temperature for prompt morning start. Top of drum is accessible while warmer is operating.

Literature also describes sizes, voltages, and thermostats which are available with drum warmer.

Bulletin on automatic drum warmer is available from Harold L. Palmer Company, Dept. CP, 2980 W. Davison, Detroit 6, Michigan. When inquiring specify CP 7672 on handy form which is located opposite last page.

### Installation costs are reduced with factory-fabricated electrical assemblies



Two sets of three 500-MCM cables Cadwelded to  $\frac{1}{6}$  x 6 x 8" copper lugs

Electrical assemblies — jumpers, leads, or lug assemblies — are custom-made in the factory to meet exact specifications of job requirements. Cadweld Process is employed for making the electrical connections. Use of these assemblies is said to reduce installation and maintenance cost, and eliminate power loss from deteriorating connections. Connections have 100% current carrying capacity of conductors

(Electrical assemblies are fabricated by Erico Products, Inc., Dept. CP, 2070 E. 61st Pl., Cleveland 3, Ohio . . . or for more information check CP 7673 on convenient Readers Service slip which is located opposite last page.)

# Set Both bearing features



# fully enclosed and protected

dirt out. What's more, large grease reservoirs act as additional dirt traps.

the bearing enclosure.

motor . . . retains an ample supply within

At the outer side of the bearing, double labyrinth seals keep grease in, also keep

You can lubricate the bearings without dismantling the motor. Pipe-tapped holes in the bearing housings at three points provide both means for inserting new grease and a means of flushing out old grease.

Look for the extra bolts on the end housing ... the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.



# (AC)

# **ALLIS-CHALMERS**

When inquiring check CP 7674 opposite last page



When inquiring check CP 7675 opposite last page

### MAINTENANCE

### **Guide to fastest** machining steel

Relative machinability, using B-1112 as standard, of fast-cutting carbon, alloy, and stainless steel is compared in four-page bulletin. Also summarized for quick reference are other principal characteristics of 17 analyses. Leaded carbon and alloy steels, newest and fastest machining in the free-cutting group, are included in the comparative study.

"Guide to Fastest Machining Steels" is available from Joseph T. Ryerson & Son, Inc., Dept. CP, Box 8000-A, Chicago 80, Illinois. When inquiring specify CP 7676 on handy form opposite last page.

### Magnetic force used instead of springs to hold seal . . .

pressures to 3000 psi, temps to 500°F handled by unit

Uses: To prevent escape of fluids under pressure around a rotating shaft.

Features: Sealing surfaces are held in contact by magnetic force when no fluid pressure exists, eliminating springs previously employed to insure engagement.

Unit is effective under pressures up to 3000 psi and temperatures to 500°F.



Seal has only three parts, is easy to install

Description: Rotary mechanical shaft seal consists of a magnetized ring with a sealing surface, fixed in stationary manner to housing, and a second ring also with a sealing surface coupled to shaft for

### FINER TEMPERATURE CONTRO THAN EVER BEFORE POSSIBLE

The Keckley Type PTM Modulating Pressure-Temperature Regulator controls temperatures in batch processing, air ducts and other control jobs with an exactness that has never before been possible. As temperature tends to vary, the thermostatic control unit acts upon the pressure regulator to reduce or increase steam pressure. Pressure will modulate smoothly and rapidly between initial setting and zero, thereby preventing overrun. Rate of pressure modulation is adjustable.

Send for Catalog 55-B—describes the complete Keckley line of Steam and Liquid Control Equipment.

O. C. KECKLEY COMPANY 400 W. Madison St. . Chicago 6, III.



Pressure Regulators . Temperature Regulat

When inquiring check CP 7677 opposite last page



THREAD COMPOUND

Fel-Pro's exclusive C-5 colloidalcopper formula "copper-plates" metal, prevents locking, galling and direct contact between thread assemblies even at 1800°F without breakdown! And C-5 is safe for all metals!

Prevents galvanic pitting even where dissimilar metals are joined! Protects all threaded surfaces of bolts, plugs and studs, insuring their repeated re-use. WRITE TODAY FOR FREE **BULLETIN!** 

### FELT PRODUCTS MFG. CO.

1515 Carroll Ave., Chicago 7, III.

When inquiring check CP 7678 opposite last page

CHEMICAL PROCESSING

FREE BULLETIN How to Solve High Temperature

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HYDRAULIC PRESSURE (with gir—100 psi)

COMPLETE RANGE OF 35
STANDARD MODELS,
SINGLE OR DOUBLE ACTING
FROM 230 PSI
WITH OUTPUT FROM
3,360 CU. INS. PER MIN.

- Air-Hydro-Pump is the finest pressure unit for rapid testing of valves, boilers, piping pressure vessels.
- Sustains constant pressure on Rolls, Rams, Presses.
- · Portable for site testing.
- Water, Oil, Diluted Alkalis or Acids can be used.
- · Made of non-ferrous metals.

Also 6 JUNIOR MODELS

Fluid pressures 400 psi to 10,000 psi \$185.00 f.a.b. New York

DAVIES BROS. 120 WALL ST., N. Y. 5, N. Y.

When inquiring check CP 7679 opposite last page

CHEMICAL

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"U. S." chemical ceramic vacuum filters are made in three ceramic bodies: white chemical porcelain; standard "Denstone" chemical stoneware; and "Ceratherm-550" heat-shock-resistant chemical stoneware. All three bodies will withstand a complete vacuum.

Available in a range of types, including two-piece units with removable support plates, two-piece units with integral support plates, and three-piece sectional units. Sizes range from small laboratory filters up to units of 100 gallon capacity.

Write for Bulletin F-40



U. S. STONEWARE

When inquiring check CP 7680 opposite last page JUNE, 1955

### MAINTENANCE

rotation by means of an "O"-ring. Second ring is movable axially along shaft in response to magnetic attraction until it engages first ring. Simplicity of structure, with only three parts, provides ease of installation, increased durability.

(Magnetic mechanical shaft seal is a product of Magnetic Seal Corp., Dept. CP, Higgins Street, Georgiaville, R. I. Check CP 7681 opposite last page.)

3-D rotation of jet allows 1 operator to clean tanks...

two powerful water streams give scrubbing action

Uses: Tank cleaning operations.

Features: Portability of unit enables one man to handle entire tank cleaning operation without assistance. Supply hose is means by which unit is lowered through tank access. Since it is completely controlled from outside, there is no need to enter tank.

Compact, lightweight device delivers two powerful streams of hot or cold water, with or without detergents, over entire inside surface of any shaped tank.

Description: Mechanical movement of tank cleaning unit assures complete coverage. Cleaning speeds are fully adjustable — high speeds for light cleaning or rinse; slow speeds for heavy cleaning give longer hydraulic scrubbing and greater heat transfer to surface.

Two jets, powered by a venturiinjector, provide high velocity streams so that a scrubbing rather than cascading action results. Jet head is rotated pneumatically, utilizing all hydraulic power for cleaning; none is lost to rotating.

Unit is available in three models for discharge capacities from 600 to 6000 gph.

(Rotor Jet tank cleaner is a product of Sellers Injector Corporation, Dept. CP, 1600 U Hamilton St., Philadelphia 30, Pa. Check CP 7682 opposite last page.)



### Best for Free-Filtering Materials

For continuous separation of free-filtering materials such as coarse crystalline or fibrous pulps, the new FEinc Horizontal Rotary Vacuum Filter is the simplest and fastest type available. It offers six advantages:

(1) Hourly output is extremely high; (2) Multiple-stage or counter-current washing provides maximum recovery of solubles with minimum dilution; (3) Results are always visible, easy to control; (4) Cakes can be built up to 4" or more; (5) Central-mounted drive simplifies installation and maintenance; (6) It is available with totally enclosed rubber-covered or other special constructions.

The FEinc Horizontal is only one of many continuous filters now made by Filtration Engineers. Our Engineering service is the finest available, backed by 35 years of experience, and by the ability to deliver filters that are tailor-made to fit the job . . . at no more than

standard costs. Whatever the filtration problem, talk to FEinc first.

Ask for Bulletin

# Filtration Engineers, Inc.

CUSTOM DESIGNERS AND MANUFACTURERS OF ALL TYPES OF CONTINUOUS FILTRATION EQUIPMENT FEinc

155 ORATON STREET . NEWARK 4, N. J.

When inquiring check CP 7683 opposite last page

No. 4\* of ...

### 12 REASONS WHY YOU SHOULD BUY AND USE LOW-PRICED



Low friction Teflon washer permits spring to turn with plug. This means that less maintenance and longer life are assured, because the spring is subjected to compression only.

This is only one reason why you should BUY AND USE, low priced HOMESTEAD LUBRICATED PLUG VALVES.

### HERE ARE ALL TWELVE

- 1. Reinforced Teffon packing ring.
- 2. Completely controlled high-pressure lubricant
- 3. 100% pipe area and venturi patterns.

- 4. No spring torsional stress. 5. No mechanical adjustments.
- 6. Two lubricants handle most services.
- 7. Extremely close tolerance between sealing sur-
- 8. Triple head-seal with Lubricant and Teffon packing ring.
- 9. Plug floated on Teflon surfaces.
- 10. Leak-proof, double-ball-and-lubricant-sealed
- 11. Full-threaded screw assures clean lubricant.

12. Extruded lubricant shows a full protecting system.

FOR CATALOG AND COMPLETE DETAILS MAIL	COUPON TODAY	MONTEAD
Without obligation, send Reference Book 39—Section 5 on HOMESTEAD LUBRICATED PLUG VALVES.		
NAME	TITLE	
COMPANY		
ADDRESS		
СПУ	STATE	
HOMESTEAD WALVE HANDE	ACTUBING	COMPANY

P. O. BOX 140

CORAOPOLIS, PA.

When inquiring check CP 7684 opposite last page

### MAINTENANCE

### Split-second impact of compressed air cleans drains

Cleaning clogged drain pipes and sewers up to 6" size.

Features: Unit operates on splitsecond impact principle. Sudden release of a charge of compressed air striking a solid water column, delivers a wave of energy which clears stubborn drain blocks.

Description: Principle upon which unit operates is that of the sudden blow of a hammer against a nail, which drives nail forward with very little sideways pressure. Thus, when clearing a pipe, danger of damaging pipe is eliminated since less than 2% of total impact is delivered against walls.

(Hydraulic Water Ram pipe and drain cleaner is a product of Hydraulic Mfg. Co., Dept. CP, Kiel, Wis. Check CP 7685 opp. last pg.)

### **Zirconium and Teflon** let mechanical seal do rugged service

In operations where carbon cannot be used because of chemical properties of material being pumped or mixed; also for sealing under slurry conditions that previously could not be handled by mechanical seals.

Features: Seal is made with stator bushing fabricated of Zirconium-filled Teflon molded on pure Teflon.

Description: Mechanical seal is designed for complete interchangeability with stuffing box packing in pumps and other rotating processing equipment. Seal requires no special holding clamps, no machining of stuffing box faces to assure alignment. It is designed for suction pressures up to 35 psi and temperatures up to 500°F.

(Chempro mechanical seal, Style WLZ, is a product of Chemical and Power Products, Inc., Dept. CP, 11 Broadway, New York 4, N. Y. . . . or for more information check CP 7686 opp. last page.)



When inquiring check CP 7687 opposite last page

# GASKETS · SHIMS WASHERS



livery.
Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . and in quantities to meet your pro-duction requirements.

Write for catalog and submit your specifications for quotation.

### CHICAGO-WILCOX MFG. CO.

7701 South Avalon, Chicago 19, Illinois

When inquiring check CP 7688 opposite last page

CHEMICAL PROCESSING

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ing ram.

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> Engine Foote 4545 inquiri

IUNE, 19

### Lightweight hydraulic bender has power of heavyweight and is portable . . .

CT.

can be used to bend pipe, tubing, bus bar and all conduit

Uses: Bending pipe, tubing, bus bar, and all types of conduit.

Features: Bender is easily transported and set up, even in hard-to-get-at locations. Full 90-degree bends can be made with this 15-ton bender with one setting of part to be bent and with one stroke of ram.



Full 90° bends can be made with one stroke of ram

Hydraulic bender consists of two sec-Description: tions—the two-speed hydraulic pump and the bending ram. Linked with a six-foot section of high-pressure hose, the two units can be quickly disconnected by a speed coupling for easy handling. Although equipped with attachments for bending rigid conduit and pipe from 1/2 to 2", ram is so designed that it will fit other bending attachments manufactured by company.

(No. 880 hydraulic bender is a product of Greenlee Tool Co., Dept. CP, 2136 12th St., Rockford, Ill. Check CP 7689 opposite last page.)

### Specifications, engineering data, and maintenance of gearing

In addition to illustrating manufacturer's line of Duti-Rated Lifetime Gearing, 30-page spiralbound book contains specifications and general design material helpful in gear set selection. Efficient, space-saving gear arrangements are

Engineering Manual DR No. 2 is issued by Foote Bros. Gear & Machine Corp., Dept. CP, 4545 S. Western Blvd., Chicago 9, Ill. When inquiring specify CP 7690 opposite last page. small dust filters do BIG JOB!

Two small Dracco Multi-Bag Filters are mounted on roof of Niagara Chemical plant to control and recover costly toxic chemical dusts produced in insecticide manufacturing operations.

At its Middleport (New York) plant, the Niagara Chemical Division of the Food Machinery and Chemical Corporation gets big results from its battery of small Dracco Multi-Bag Filters. By recovering toxic dusts, these filters produce better plant safety plus important cost savings.

Mounted on the roof to save space, the Dracco Filters trap toxic organic chemical dusts such as Parathion, DDT, and Benzene Hexachloride created during production of insecticide and fungicide dusting powders.

Primary purpose of the dust collection system is to protect workers' safety since the dusts are a distinct health hazard. The hazardous dusts are captured at their source, then carried away in an enclosed system before they can harm personnel.

Since the dusts are high-cost chemicals, their recovery by the Dracco units and return to process represents a sizable cost saving for Niagara Chemical.

Dracco makes Multi-Bag Filters in sizes to do any dust collection job, each specially engineered for its specific application. All operate at better than 991/2% efficiency.

To get big results in handling your dust problems, contact Dracco for the best in engineered dust control.

DRACCO CORPORATION 4070 East 116th Street • Cleveland 5, Ohio



When inquiring check CP 7691 opposite last page

NG



If your processing involves dust, what the Morton Salt Co. has accomplished will be of interest to you.

Three years ago at one of its mills, this company had a serious dust problem - and installed a Sly Unit Filter. The equipment has proved entirely satisfactory in cleaning up the plant and improving its appearance.

Since then the Morton Salt Co. has made Sly installations at five other plants - not only Unit Filters but also the larger standard Filters including the Sly Dynaclone. These Filters are handling salt and similar dusts from conveying, screening, blending, and packaging operations.

In industries where collected dust is high in value, such as pigments, metallic and non-metallic minerals, Sly Dust Control not only cleans up the plant but also saves thousands of dollars yearly in value of collected dust.

Since 1874, Sly has pioneered and developed positive dust collection equipment . . . the original patentee of the cloth type filter more than 50 years ago.

Regardless of what you make, if you have a dust problem, our long experience in collecting all kinds of dusts can be of value to you in cleaning up the plant and effecting savings which frequently repay, in a relatively short time, the cost of the equipment.

May we send you Bulletin 98, full of helpful information on dust control? If it's DUST, it's SLY.

> Manufacturers of: Dust Control Systems, Blast Cleaning Equipment, Tumbling Mills, Industrial Ovens.

THE W. W.



4754 TRAIN AVENUE . CLEVELAND 2, OHIO New York • Chicago • Philadelphia • Rochester • Birmingham • Cincinnati Buffalo • St. Louis • Minneapolis • Detroit • Denver • Los Angeles • Toronta

PIONEERS AND LEADERS IN INDUSTRIAL DUST CONTROL

When inquiring check CP 7692 opposite last page

### MAINTENANCE

### For testing, development irradiated polyethylene extrusions . . .

tubes, rods, shapes made to specifications

Companies interested in possible applications of irradiated polyethylene can now obtain crosslinked tubes, extruded shapes, or rods for their testing, research, and development programs.

Extruded components are made to specifications in each case and then given various irradiation dosages. Thus, for example, 1000 feet of a .172" O.D. oval tube with a wall of .020" is extruded and supplied in small coils in batches with irradiation dosages ranging from 10 x 106 REP (Roentgen Equivalent Physical) to 32 x 106 REP.

(Aeroflex irradiated polyethylene extrusions are available from Anchor Plastics Company, Dept. CP, 36-36 36th St., Long Island City 6, N. Y. . . . or for more information check CP 7693 on handy form which is located opposite last page.)

### Jet syphon performance tabulated in bulletin

Application, construction, operation, and performance of jet syphons are treated in 24page bulletin. Units described utilize pressure energy of steam or air to pump, heat, and mix liquids, gases, and slurries. Included are 17 tables on suction capacities, steam consumption, operation pressures, and sizes and dimensions.

Special purpose jet syphons are also described, including leadlined, glass, special alloy and other corrosion-resistant types.

Bul 2-A is available from Dept. J-O, Schutte and Koerting Company, Dept. CP, Cornwells Heights, Bucks County, Pa. When inquiring reader may simply specify CP 7694 on handy form which is located opposite last page.



# VANTON'S External Bearing

Without stuffing box, gaskets or valves!

The Vanton corrosion resistant "flex-i-liner" self priming rotary type plastic pump is available in a new design that permanently protects all bearings from fumes or chemical attack.

Low maintenance is assured since shaft bearings are external and rotor assembly is stainless steel. The only wearing part is the quickly replaceable low cost flexible

Capacities range from fractional to 5 gpm with 0-50 psi discharge pressures . . . vacuum to 26" Hg. A wide selection of plastic and rubber body blocks and "flex-iliners" makes the XB ideal for handling corrosive liquids, gases, viscous fluids or abrasive slurries.

Division of Cooper Alloy Corporation . HILLSIDE, N. J.

When inquiring check CP 7695 opposite last page



2. GUIDE - Also of carbon-graphite. Makes joint self-

4. SPRING — For initial seating only. initial seating only. In operation joint is pressure sealed. Only 4 Internal

Parts

3. NIPPLE—Rotates with roll, seals against ring.

For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been adopted by dozens of machinery makers, and is finding

new uses every day.

Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. Write for literature.

### Johnson Corporation

826 Wood St., Three Rivers, Mich.

When inquiring check CP 7696 opposite last page

CHEMICAL PROCESSING

Low pr on reg un

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Low pressure drop achieved on regulating valve using venturi principle . . .

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SSING

unit has self-cleaning spherical inner valve

Uses: For a wide range of applications, including water, gas, steam, air, oil, and other non-corrosive fluids.

Features: Low pressure drop is achieved through use of venturi principle. Velocity of gas or liquid passing venturi orifice creates suction, reducing pres-

sure in lower diaphragm chamber and opening valve wider to produce lower pressure drop.

Unit also incorporates a spherical, self-cleaning inner valve. Free rotation of ball permits different seating position at closure, adding substantially to life of valve. A large area built-in strainer is also included in the unit.

Description: Selfcontained, single seat valve operates within a range of

300 psi inlet pressure and 3 to 250

psi delivered pressure. Units are available in aluminum, bronze, iron, steel, or other specified materials. Interior of valve is readily accessible for easy servicing without removal from pipeline.

(Pressure reducing and regulating valve, Type 1260, is a product of A. W. Cash Company, Dept. CP, P. O. Box 551, Decatur, Ill. . . . or for more information check CP 7697 on handy form which is located opposite last page.)



Valve operates within a range of 300 psi inlet pressure and 3 to 250 psi delivered pressure

#### Gives comprehensive coverage to rubber products

Fully illustrated and printed in color, 58-page case-bound catalog gives comprehensive description of all company's industrial rubber products. Catalog is divided into sections for quick reference. Sections cover such products as belting, hose, packing, and molded products.

"Industrial Rubber Products" is available on letterhead request to Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Dept. CP, Tacony and Comly St., Philadelphia 24, Pa.

#### cone spray

Most popular design for cooling, recooling, washing, rinsing, air conditioning, drying and other spraying operations in industrial and processing work and in power plants.

Non-clog involute design has no internal parts (vanes or deflecting plates) on which foreign particles can collect. Special contour of nozzle body guides flow with minimum loss of energy towards discharge opening, where liquid attains maximum velocity and leaves nozzle in a fine hollow-cone spray.

#### Available in three types:

Bar-stock bronze (shown) for fine spray
Sizes ¼" and ¾", male or female connection Capacities up to 3 gpm; pressures 20 to 50 psi

Cast bronze Type B (shown) for air conditioning and small recooling systems
Five sizes, ½" to 1½" Capacities up to 40 gpm; pressures 7 to 25 psi

Cast bronze Type C (not shown) for spray pond service Sizes 2" and 21/2" Capacities up to 110 gpm; pressures 7 to 15 psi

Write for YARWAY Spray Nozzle Book N-617; it gives capacities, dimensions and application

## tan spray

Preferred for many washing and cooling operations. Non-clog design, delivers flat fan-shaped sheet of spray with slicing action particularly desirable for surface washing.

Thin sheet of spray is discharged forward 30° from the vertical, spreading in fan shape up to 140°, depending on operating pressure.

Made of bronze, steel or other bar-stock metals, male thread, six sizes  $\frac{1}{2}$ " to 1", capacities up to 7 gpm, pressures up to 50 psi.

Write for YARWAY Spray Nozzle Book N-617.

#### YARNALL-WARING COMPANY 125 Mermaid Avenue, Philadelphia 18, Pa.

BRANCH OFFICES IN PRINCIPAL CITIES





WAY spray nozzles

When inquiring check CP 7698 opposite last page



Charging the Abbé Dispersall Mixer described here

# ... then Investigate the Abbé Dispersall Mixer

Mixing Cycle?

Here's what a user in the ceramic field has to say about fast mixing cycles:

"We mix a 5000-lb. charge of air-floated clay and other ingredients in a total of 60 minutes-35 minutes to charge, and 25 minutes to mix. Our experience has been that a similar amount of slip with the standard equipment used in the industry would require several blunges for the same amount of ingredients. Before installing the Abbé Dispersall Mixer, our blunging cycle /was a minimum of 4 hours per mix."

#### FOR MOST FLUID MIXES AND PASTES

... the Abbé Dispersall Mixer gives you power and speed, plus the tremendous advantage of easy cleaning, which readily allows shifting from one color or formulation to another. Tooth pastes, creams, ointments, latex and other paints, inks, colors, pharmaceuticals . . . these are just a few of the products that are mixed and dispersed better and faster in the Abbé Dispersall Mixer in a ONE-stage operation.

WRITE FOR CATALOG 68

ABBE ENGINEERING COMPANY 50 Church Street . New York 7, N. Y. Address Department 46

When inquiring check CP 7699 opposite last page

#### engineering and maintenance



Facing expensive losses of material and constant maintenance, I-T-E Circuit Breaker Co. switched to a sealless unit which -

# saves \$45 a day pumping trichlorethylene

Leakage has been halted and no maintenance has been required in over 3000 hours of operation

Constant maintenance head-Problem: aches were caused by original pump installed at I-T-E Circuit Breaker Co. in Philadelphia, to handle trichlorethylene at 180-185°F in a metal parts degreasing operation. The chemical ate away pump packings and packing lubricants, and the shaft scored, intensifying packing problems. Leakage of trichlorethylene was the biggest problem, however. Unit lost 10 gallons a night when shut down, in addition to 15 gallons a day in operation. Costs for loss of material alone amounted

Several packings, both standard and special, were tried in hopes of cutting losses. However, in spite of packing replacement two or three times a week, trichlorethylene continued to be lost.

In December, 1953, I-T-E replaced this unit with a centrifugal pump which has no stuffing box, no seals, and needs to lubrication. Maximum head is 52 ft, and capacity is 38 gpm. In this operation it is required to pump against a 20 ft head, giving a capacity of about 25 gpm, since impeller has been trimmed. Totally-enclosed pump is constructed of cast iron wetted parts and has Class A insulation with Graphitar bearings. Power

to approximately \$45 a day.

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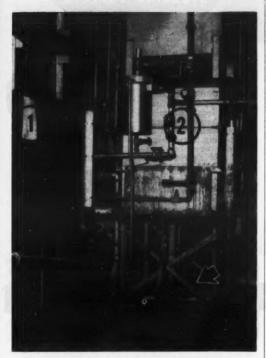
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Degreaser (1) at I-T-E Circuit Breaker Co. is served by distillation unit (2) and sealless pump (arrow)

is 1/3 hp, 220/440v, 3-phase, 60 cy. In operation, a back flush of distillate (trichlorethylene) is fed to rear of pump to cool rotor and bearings, and to keep dirt out of bearings. If a slurry were being pumped, a clear liquid would be used in this circulation line.

Results: Since installation of this centrifugal unit, a Model CF Chempump, not a drop of trichlorethylene has been lost. The pump has operated for over 3000 hours without maintenance of any sort.

(Leakproof pump is a product of Chempump Corp., Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. Check CP 7700 opposite last page.)



Close-up of pump showing back flush line (arrow) which recirculates part of trichlorethylene as a coolant for rotor and bearings



# X-Ray Inspection FOR QUALITY CONTROL

KOVEN equipment in all metals and alloys includes: High pressure vessels, extractors, mixers, stills, kettles, tanks, stacks, breechings. Shop and field erected storage tanks to 2 million gallons. High vacuum testing.

WAS MAKING INDIVIDUALIZED CHEMICAL EQUIPMENT

> Today the good works of the Salvation Army are famous throughout the country. Yet as far back as the days when only eight dedicated men and women comprised the entire American Salvation Army, KOVEN-built equipment was already in use-successfully increasing production and cutting costs for the chemical industry. Profit-minded manufacturers have long known that KOVEN Individualized Equipment-built to their exact needs-is the surest way to efficient, more economical output. Make KOVEN's over 70 years of steel fabricating experience work for you. Discuss your production problems with a trained KOVEN representative. There's no obligation—so call or write today for a consultation. Send for Bulletin #550.

> > Specialists in intricate fabrication using:

- stainless steel
- monel
- nickel
- aluminum
- inconel
- all clad materials

Fabrication to all A.S.M.E. Codes

L. O. KOVEN & BRO., INC. 154-E Ogden Ave., Jersey City 7, N. J.

KOVEN FOR INDIVIDUALIZED **EQUIPMENT SINCE 1881** 

When inquiring check CP 7701 opposite last page

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NEWARK ACCURACY COMPANY 351 VERONA AVENUE • NEWARK 4, NEW JERSEY

When inquiring check CP 7702 opposite last page

MAINTENANCE

**Grommet takes shape** after attachment, serves as seal . . .

pressures to 225 psi are held

In addition to serving in Uses: conventional capacities, grommet can be used as a pressure seal, parts positioner, vibration dampener, as well as an insulator.

Unit takes final shape after attachment. One end of grommet has a taper design, and it is this end which is inserted into hole of product or part. Then, the cable, tubing, or wire which is to be secured is inserted through the hollow center of the grommet for desired length plus several inches.



Grommet is first inserted into hole of product or part

When wire or tube is then pulled in a reverse direction, the tapered end of the grommet "rolls" and "locks" into position,

Grommet can be loosened and removed with same ease that it was originally attached. Contained wire or tube is pushed or drawn in same direction as grommet was originally inserted and tapered end of unit unlocks for rapid removal.



Grommet takes shape after attachment, provides pressure seal

Description: Roll-Lock grommet is available in a wide range of sizes to meet various needs. Unit LENAPE STUDDING OUTLETS

offer many advantages

Curved Stud-ding Outlets or Pads in ASA sizes and standards proand standards pro-vide reinforcement of the shell opening. Stud-ding outlets, naturally short in height and providing reinforcement of the opening, have design



appeal, economy in price and fabrication, and advantages in use.

Important applications include interdeck access openings on small diameter towers or columns, boiler mountings, clean-out or observation ports, and similar uses in close-clearance locations.

Sizes 16" and larger (even to 30" I.D.) are ideal access openings and in 18" and 20" sizes are the most modern and economical manway for LPG tanks.

Complete standards on pages 36-39 of Lenape Catalog 10-53. ENAPE IYDRAULIC PRESSING

When inquiring check CP 7703 opposite last page



\* You have 50% LESS WEIGHT to handle

You SAVE 50% in maintenance LABOR as plates are changed from outside the tank without dumping solution

. besides all these you get faster heating or cooling. Take advantage of the engineering assistance offered by Kold-Hold to help you with your heat transfer problems.

Send for complete technical manual and descriptive Bulletin No. P54



When inquiring check CP 7704 opposite last page

CHEMICAL PROCESSING

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can be molded from standard or special rubber compounds to resist abrasion or the effects of chemicals and solvents as well as temperature extremes.

(Moorhead Roll-Lock grommet is a product of The Stalwart Rubber Company, Dept. CP, 221 Northfield Rd., Bedford, Ohio . . . or check CP 7705 opposite last page.)

Precise metering unit has maximum rate of 2400 mi/hr...

> pumps against pressures to 1000 psig

Uses: In laboratories, pilot plants, and process industries where controlled-volume pumping of liquids at micro flow rates is essential.

Features: Piston-diaphragm unit will operate against pressures up to 1000 psig and has a maximum flow rate of 2400 ml/hr.

There is no stuffing box, packing or running seal to come in contact with liquid being pumped. Product is isolated from all pumping parts by hydraulically-balanced diaphragm and is kept safe from contamination and leakage.

Description: Design of metering pump is such that a standard 1/20 hp electric motor without gear reduction or other special features can be used. Pumping rate, established by length of piston stroke, is handset on dial indicator calibrated in 1000 increments. This setting can be manually adjusted in infinite increments while pump is idle or operating, and has a range from 0 to 100% capacity.

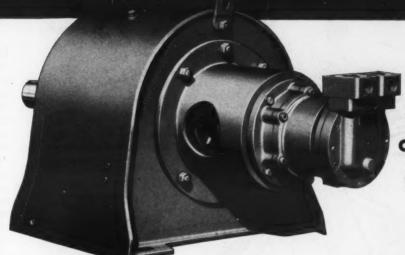
(Microflo Pulsafeeder metering pump is a product of Process Equipment Division, Lapp Insulator Co., Inc., Dept. CP, 7 Gilbert St., LeRoy, N. Y. . . . or check CP 7706 opposite last page.)

as

ING

For more information on product at right, specify CP 7707 . . . see information request blank opposite last page.

# **NOW! NEW OILGEARDUCERS**



Offering
for the first time
compact, packaged,
fluid power output
drive units!

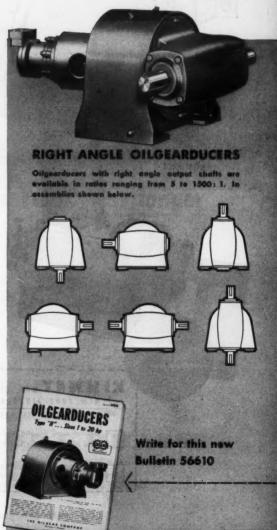
 Oilgearducers are new integral output drive units combining Oilgear Fluid Power axial piston motors and Falk All-Steel Reducers. There are horizontal and vertical models, concentric and right angle types and single, double, triple and quadruple reduction. Now, for the first time you can get a complete, easy to install, "ANY-SPEED" output unit for your high torque, low maximum speed drives. When used in combination with Oilgear Fluid Power Pumps, these reversible Oilgearducers provide infinite variability of speed, absolutely controlled rate of acceleration and deceleration, smooth and swift reversal, cushioned braking. All these together with major economies in motor, circuitry and power requirements. This new Oilgearducer "Any-Speed" output unit is available in sizes from 1 to 20 h.p. It is unequalled for applications as diverse as canfilling, paper machines, centrifugals, cable wrappers...and in automation or feed back applications where synchronization is an absolute necessity. Write now for new bulletin 56610. THE OILGEAR COMPANY, 1583 West Pierce Street, Milwaukee 4, Wisconsin.



# OILGEAR

PIONEERS...NOW THREE PLANTS FOR FLUID POWER

PUMPS, MOTORS, TRANSMISSIONS, CYLINDERS & VALVES





When inquiring check CP 7708 opposite last page

#### ENGINEERING AND MAINTENANCE

Insulation sprays like a paint then foams to 20 times original thickness...

eliminates fitting and fastening of insulation; thickness can be controlled

Uses: Insulation of irregular surfaces such as valves, fittings, flanges.

Features: Material can be sprayed on like paint, but immediately foams to twenty times its original thickness. It eliminates problem of fastening insulation in place. It can be installed wherever a spray gun can be pointed, and will adhere to practically any clean, dry or moist surface.

Description: Sprayable isocyanate-foam insulation when first applied resembles a heavy coat of varnish. After a few minutes, however, it has swollen to a thick, airy cushion. After fifteen minutes foaming action has ceased, leaving a normal looking semirigid insulation. Two hours after it has been sprayed the material is said to be strong and rigid enough to support a man's weight.

Insulation can be applied at any desired thickness in one coat, depending on amount of liquid originally sprayed. Its most economical thickness has been found to be  $\frac{1}{2}$  to 1". The K factor of the material per inch of thickness is 24 and it weighs slightly more than 2 lb/cu ft. High-temperature limit of insulation is 225°F. Lowest temperature at which it has been tested so far is -40°F.

Spraying operation requires special machinery. Only spray gun is conventional. Before it is sprayed, insulation consists of two liquids which must be blended in exact proportions, heated to a certain temperature, and the heat retained until liquids reach gun. These and other requirements are accomplished with apparatus which was specially developed for the work.

(Poly-Cell sprayed foam insulation is a development of Insul-Mastic Corporation of America, Dept. CP, Oliver Building, Pittsburgh 22, Pa. . . . or for more information check CP 7709 on handy form opposite last page.)

# Describes lightweight blowers for special applications

Lightweight, compact, rotary-positive blowers used in moving air or gas are described in six-page bulletin. A variety of special applications for these units is illustrated. Capacity, performance, and other specifications are presented in chart form.

Bul 255 is available from Miehle-Dexter Supercharger, Div. of Dexter Folder Company, Dept. CP, 100 Fourth St., Racine, Wis. When inquiring specify CP 7709A on handy form which is located opposite last page. no sp

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When paper and tape line forms, no special preparation needed to paint concrete . . .

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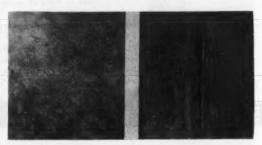
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quality and appearance of surfaces improved

Concrete with a hard surface, free of costly-toremove fins, and smooth enough to paint without special preparation, can be produced by lining form with strong paper and tape coated with Bakelite polyethylene. Process reduces cost of poured concrete surfaces while improving their quality and appearance. Polyethylene forms a moisture vapor barrier on paper and tape which extends curing time of covered concrete, giving a harder surface. Lining adheres to concrete after removal of wooden form. The form can be withdrawn for use elsewhere without impairing finish or hardness of concrete.



Concrete surface under tape-and-paper lining is unusually smooth (left) as compared with surface produced by unlined wooden form

Left in place as long as desired after removal of wooden form, coated tape-and-paper lining is easy to strip off. Ready for decorating without refinishing, resulting concrete surface is unusually smooth and glossy as compared with grained surface produced by an unlined wooden form. Lining is recommended for flat horizontal surfaces. For unusually large forms and vertical surfaces, further backing or support is suggested for best results.

(Polyethylene-coated Paper used in linings is a development of Lowe Paper Co., Dept. CP, Ridgefield, N.J. . . . or for more information check CP 7710 on handy form opposite last page.)

(Polyethylene-coated cloth tape is a product of Permacel Tape Corp., Dept. CP, New Brunswick, N. J. Check CP 7710A opposite last page.)

# Comprehensive catalog covers line of valves

Data, illustrations, and descriptive material are presented on manufacturer's line of valves in 64-page catalog.

Cat 654 is issued by Republic Mfg. Co., Dept. CP, 15655 Brookpark Rd., Cleveland 11, Ohio. Specify CP 7711 opposite last page.



# It's LAST cost that counts!

# ... and Bridgeport Duplex Tubes last longer

In the long run you save money with Bridgeport Duplex Condenser Tubes! Resisting different types of corrosion, inside and out, they eliminate the need for frequent retubing and shutdowns... often improve heat-transfer characteristics... reduce maintenance costs substantially when the proper combination of metals is used.

Bridgeport Duplex tubes are available in many combinations to match your service requirements. For example: copper-steel, cupro nickel-lead, red brass-aluminum.

Call your local Bridgeport Sales Office for complete information and the help of Bridgeport Technical Service. Ask for your copy of Bridgeport's Duplex Tube Technical Bulletin.

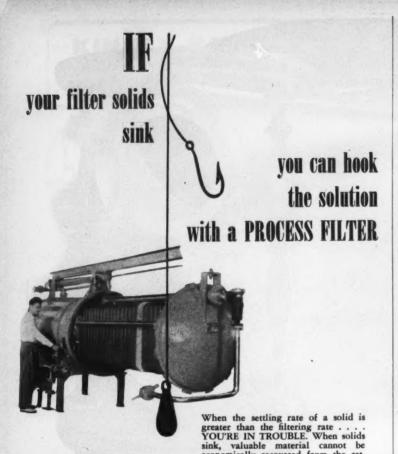




#### **BRIDGEPORT BRASS**

Offices in Principal Cities • Conveniently Located Warehouses Bridgeport Brass Company, Bridgeport 2, Connecticut In Canada: Noranda Copper and Brass Limited, Montreal

When inquiring check CP 7712 opposite last page



economically recovered from the set-tled material, also, distribution of the solids on the filter media is uneven resulting in poor filtration, low capacity and a low grade product. However, you can hook the solution to this problem with a Process Filter. Process Filters are equipped with constant rate regulators when fast setting solids require constant slurry recycle to keep solids in uniform suspension. The results . . . Filter cakes build up evenly giving maximum filter capacity all day long, while producing superior filtrate . . . Filter cakes can be air blown, steamed or washed for greater recovery of cake values.

Constant rate regulation is one of many methods of instrumentation and control of leaf filters of the PROCESS type. This control, when combined with low cost centrifugal pumps, provides the ultimate in economical filtration. Multiple filters controlled by this method can utilize a single pumping source with complete independence of each filter . . . assuring continuous production with minimum attention. Predictable high volume, sharp clarity and longer cycle lengths, whether one or several filters are in production, are some of the operating ad-

PROCESS FILTER'S advanced design features help you to beat competition by producing a better product.



When inquiring check CP 7713 opposite last page

Company .....

Address .....Zone...State.....

#### MAINTENANCE

Fan handles "solids" as well as dust. gases, fumes . . .

> rugged cast iron unit can take abrasion, high temps

Uses: For rugged industrial applications.

Features: Designed to provide versatility and efficiency, this line of fans will handle wood shavings, chips, granular material, textile fibers, asbestos, rags, powders, dust, gases and fumes.

For specific applications, any of four different wheels or three drive arrangements may be selected. Protective accessories and coatings are available for high temperature and extreme abrasion installations.



Fan series handles from 150 to 12,000 cfm air

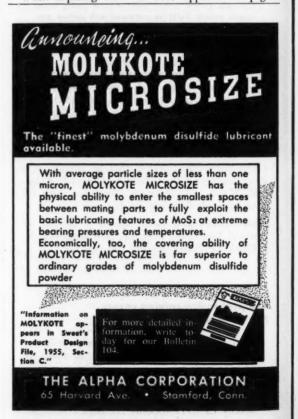
Description: Redesigned series of fans is available in a wide range of sizes with wheel diameters from 81/4 to 341/2" and inlet pipe sizes from 41/2 to 18". Air volumes range from 150 to 12,000 cfm.

Fan housings are convertible to all normal discharge directions and are also reversible. Large, heavyduty shafts with grease lubricated double row ball bearings provide long fan life with minimum maintenance. Bearings are triple sealed against penetration by powdered material handled by fans.

(500 series cast iron industrial fans are products of Dept. 022, Sturtevant Division, Westinghouse Electric Corporation, Dept. CP, 200 Readville Street, Hyde Park, Boston 36, Mass. Check CP 7714 opposite last page.)



When inquiring check CP 7715 opposite last page



When inquiring check CP 7716 opposite last page

CHEMICAL PROCESSING

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A subsidiary of Bowser, Inc. BOWSER

#### Simple by-pass treatment unit lowers cost of boiler water make-up

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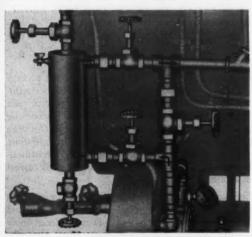
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Uses: Where water or boiler conditions do not justify installation of expensive mechanical proportioning equipment to treat boiler make-up water.

Features: Water treatment device avoids excessive feed pump wear by introducing water treatment compounds on discharge side of boiler feed pump. This eliminates pump wear usually caused by abrasive materials in powdered water treatment compounds.



By-pass feeder avoids excessive feed pump wear by introducing treatment compound on discharge side

Unit can be used to add either liquid or powdered water treatment chemicals to boiler feed water on any hot water or steam generator.

Description: Water treatment unit is manufactured of heavy welded steel. It is tested to withstand pressures to 200 psi. Tank has a capacity of 2 gal.

With the by-pass design, boiler feed water can be introduced through the tank containing a previously measured amount of water treating compound, or it can feed straight through from feed pump to boiler, simply by adjusting three valves.

(Chemical By-Pass Feeder water treatment unit is a product of Dept. 31, Cyclotherm Division, United States Radiator Corp., Dept. CP, Oswego, N. Y. . . . or check CP 7717 opposite last page.)

#### Pictures Teflon parts, properties

Finished, application-engineered Teflon parts for specific uses and needs are illustrated and described in four-page bulletin.

Bul 155 is available from Sparta Manufacturing Co., Dept. CP, P. O. Box 66, Dover, Ohio. When inquiring specify CP 7718 opposite last page.



#### BAW TUBING UNIFORMITY - MULTIPLIED 1194 TIMES

If you had this many tubes to roll in, there would be no delay if you used B&W tubes.

For heat exchangers, for condensers, in fact for every pressure tubing application, you can rely on B&W tubing for uniform wall thickness, uniform ductility, tight joints, and low installation cost.

Always specify B&W pressure tubing. It meets all dimensional and mechanical requirements, and is available, in all commercial sizes, in a wide range of carbon, alloy and stainless grades. Write for Technical Bulletin 329 CP.



THE BABCOCK & WILCOX COMPANY TUBULAR PRODUCTS DIVISION

Beaver Falls, Pa. and Milwaukee, Wis.; Seamless Tubing, Welded Stainless Steel tubing Alliance, Ohlo: Welded Carbon Steel Tubing Milwaukse, Wis.; Seamless Welding Fittings

TA-5019(P

When inquiring check CP 7719 opposite last page

# A "cushioned" porcelain-to-porcelain seal in the Lapp Valve

The chemical resistance qualities of the Lapp Valve come from the fact that the body and plug are both solid porcelain. Porcelain, as a material, however, has little resiliency or "give" when the plug hits the seat in the body. Special spring-loaded "cushion" seating in Lapp valves prevents damage from a heavy-handed operator, and warns when seal is tight. Built into the thrust bushing of every Lapp Y-valve and angle valve, is an arrangement of tempered Beryllium copper spring washers. This spring loading also provides that a closed valve will maintain its tightness even under vibration and thermal movement of parts.



When inquiring check CP 7720 opposite last page

#### ENGINEERING & MAINTENANCE

Provides variable-speed output from constant-speed input by electromagnetic force . . .

no mechanical contact between driving and driven members of transmission

Uses: Variable-speed drive applications, single or multiple.

Features: Power transmission unit provides variable-speed output from a constant-speed input while transmitting constant torque. Clutch is used as a variable-speed coupling to connect constant-speed electric motor to the variable-speed driven machine. It transmits constant torque through use of electromagnetic forces regulated by field excitation. There is no mechanical contact between drive and driven members.

Description: Power transmission unit is a package consisting of these four primary elements: electromagnetic clutch, magnetic amplifier control and power supply, speed set station, and tachometer generator. Basic principle involved in performance of drive is control of slip in clutch. In operation, when field coils on input shaft are rotated mechanically, soft iron armature remains stationary until current is applied to coil.

Energizing field coil produces lines of force which flow through electromagnets into soft iron ring and cause eddy currents to flow. These induced eddy currents develop a second magnetic field. Attraction of these fields makes soft iron ring of output shaft follow electromagnetic field of input shaft in rotation.

To develop secondary magnetic field, it is necessary that there be a relative difference in motion between the two members. Therefore, speed of output shaft will always be less than speed of input shaft. This amount of slip determines maximum torque capacity of clutch.

(IVC—Infinitely Variable Control—power transmission unit is a product of Mechanical Handling Systems Inc., Dept. CP, 4600 Nancy Ave., Detroit 12, Michigan. Check CP 7721 opposite last page.)

Internally-finned tubes on boiler provide increased capacity in less space . . .

compact unit is only 2/3 size of bare tube boilers of equal capacity

Uses: Industrial steam generation.

Features: Internally-finned tubes in boilers produce a fire-side to water-side surface ratio of about 3 to 1, as compared to fire-side to water-side ratio of only 1 to 1.1 for plain bare tubes. Almost 3-1/3 times more surface area is provided to pick up heat and transfer it to water.

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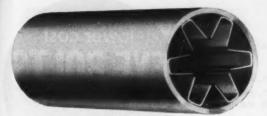
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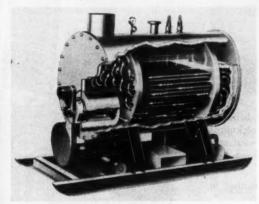
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Internally-finned tube provides about 1-1/3 times greater fire-side surface to water-side surface ratio

In addition, internal finning increases turbulence of hot gases, and brings them into much more intimate contact with heat transfer surface than is possible in a plain, bare tube. Due to high heat transfer rates, boilers are said to come up to full steam pressure in about ten minutes.

Description: Small and compact, boilers can be installed where headroom is limited with consequent additional savings in building costs. The 100-hp boiler with internally-finned tubes, for instance, is only about 2/3 as wide, 2/3 as long, and 2/3 as high as a bare tube boiler of equal capacity.



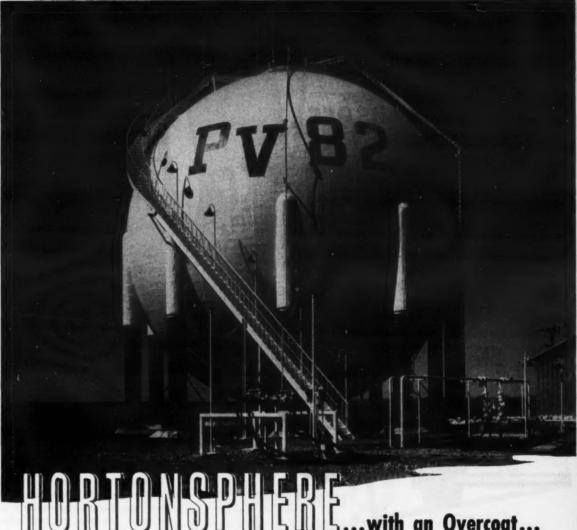
Arrows indicate heat flow through boiler

Boilers are completely self-contained, modular units. Any number of boilers can be connected together with inter-locking controls to provide any capacity. (Finned-tube boilers are products of Brown Fintube Co., Dept. CP, 150 Huron St., Elyria, Ohio . . . or check CP 7722 opposite last page.)

# Precision-molded rubber parts described and illustrated

O-rings and precision-molded parts for industrial, commercial, and aircraft use are described in 24-page illustrated catalog.

1955 product catalog is available from Stillman Rubber Co., Dept. CP, 5811 Marilyn Ave., Culver City, Calif. Specify CP 7723 opposite last page.



# JULU WINDU ULLUL...with an Overcoat...

designed for 75 lbs. per sq. in. working pressure stores anhydrous ammonia

• This 15,000-bbl. Hortonsphere\*, insulated and refrigerated to help reduce pressure of stored anhydrous ammonia, is located at the Curry Chemical Company, Funk, Nebraska. It has been designed to withstand internal pressure and will not allow contents to escape as long as the setting of the pressure relief valves are not exceeded. Hortonspheres, for the storage of such liquids as anhydrous ammonia, butadiene, and other volatile liquids, are available in sizes to 30,000 bbls. Write our nearest office for complete information or quotations.



# Chicago Bridge & Iron Company

\*Aflanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • New York

Philadelphia • Pittsburgh • Salt Lake City • San Francisco • Seattle • Tulsa • Washington

When inquiring check CP 7724 opposite last page

# point of interest to pump users...



Chemiseal Mechanical Seals last longer and give unsurpassed performance in a wide variety of chemical services.

Three years of actual field experience has proven it—handling acids, alcohols, alkalies, hydrocarbons; clear, abrasive and tarry materials.

Features: Seal rotates with shaft. Only bearing surface is between precision ground rotating and stationary faces. Combines chemically impervious TEFLON with a balanced bellows design.

Low friction load on shaft. Lower power cost.

No scoring of shafts. Even shafts already scored can be satisfactorily sealed.

Pressures at seal up to 100 psi at 75°C or 75 psi at 100°C.

Sizes from %'' to 2%''. Maximum length 2%''. Other sizes for special applications.

Write for Bulletin No. MS-954.

UNITED STATES GASKET COMPANY CAMDEN 1, New Jersey

USG

FABRICATORS OF FLUOROCARBONS & OTHER PLASTIC

Representatives in principal cities throughout the world

When inquiring check CP 7725 opposite last page

#### ENGINEERING & MAINTENANCE

S-curved surfaces can be heated with electrothermal tape . . .

material can be squeezed or stretched to fit on equipment being heated

Uses: In addition to laboratory uses, industrial applications can be made on pipes, valves, gas cylinders, spray guns, and injection molding machines.

Features: Knitted electrothermal heating tape doesn't buckle and can be stretched or squeezed to fit on equipment being heated. It can frequently be repositioned without rewinding. Tape is suitable for heating surfaces with a double curvature.



Description: Current-carrying resistance bands in tape are insulated on both sides by layers of knitted glass yarn. Construction makes it safe to wind tape on metal. Insulation on both sides minimizes heat losses to atmosphere.

Tape in  $\frac{1}{2}$ , 1, 2, and  $3\frac{1}{2}$ " widths is furnished in lengths of 2, 4, 6, and 8'.

(Knitted electrothermal heating tape is a product of Arthur S. LaPine & Company, Dept. CP, 6001 S. Knox Ave., Chicago 29, Ill. . . . or for more information check CP 7726 opposite last page.)

Efficient water heating assured by unit designed for direct connection to lines . . .

produces water temp rise to 100°F with water at 100 psig, steam at 100 psig

Uses: Continuous heating of water in processing pipe lines.

Features: Designed for direct connection to water or steam lines, heater will produce a water temperature rise up to 100°F with water at 100 psig and steam at 100 psig. In the heater, liquid under

# Threaded Specialties

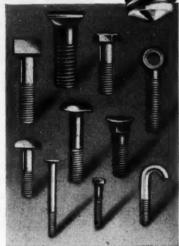
lower cost
EYE BOLTS
by an

exclusive method

Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket eye bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, includin Titanium



BETTER BOLTS SINCE 188

PAWTUCKET

MANUFACTURING COMPANY
MASS 327 Pine St. Pawtucket, R. I

327 Pine St. Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

When inquiring check CP 7727 opposite last page

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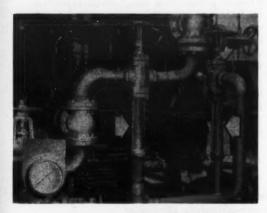
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pressure attains a high velocity passing through a nozzle. Steam enters through a series of slanting nozzles in the combining tube and an intimate mixing of liquid and steam occurs in the venturi throat, where liquid absorbs all of the heat of the steam.

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Description: Water flow regulation in heater is obtained by adjustment of non-seating screw spindle in water nozzle. Spindle design insures correct proportions of steam and liquid. Flow rates can be duplicated through use of an indicator.

Some applications call for a greater temperature rise than 100°F. In these cases, two heaters may be used in series. An example of this is an installation on a Gulf Oil Corporation catalytic polymerization unit at the company's Girard Point Refinery, Phila.



Arrows indicate water heaters installed on a catalytic polymerization unit at Gulf Oil's Girard Point refinery

In this installation, as illustrated, heater system consists of one 2½" unit and one 3" unit. Combined, they produce a temperature rise from 60 to 300°F, using 80 psig water and steam at 175 psig.

A temperature rise of about 100 degrees is produced in the first heater. This partially heated water is then piped to the suction connection of the second heater where additional rise is produced. System produces 200 gpm of water at 300°F and discharges against 100 psig.

(Figure 320 continuous jet pipe line and water heaters are products of Dept. JN, Schutte and Koerting Co., Dept. CP, Cornwells Heights, Bucks County, Pa. Check CP 7728 opposite last page.)

#### Method for sizing controls

Recently developed method for sizing valves for liquid, steam, and gas applications is presented in 24-page manual.

"Controls Sizing Manual" is available from Black, Sivalls & Bryson, Inc., Dept. CP, 7500 E. 12th St., Kansas City 26, Mo. When inquiring specify CP 7729 on handy form opposite last page.



# Pure Carbonic Company

NATION-WIDE "DRY-ICE" SERVICE-DISTRIBUTING STATIONS IN PRINCIPAL CITIES

GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK 17, NEW YORK

PURE CARBONIC COMPANY is a division of AIR REDUCTION COMPANY, INCORPORATED Principal products of other divisions include: AIRCO—industrial gases, welding and cutting equipment and acetylenic chemicals OHIO—medical gases and hospital equipment NATIONAL CARBIDE—pipeline acetylene and calcium carbide COLTON—polyvinyl acetates, alcohols and other synthetic resins.

When inquiring check CP 7730 opposite last page

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# Want to forget about rust for 20 years?



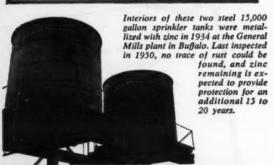
Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without *any* further maintenance.

These unique coatings are mechanically bonded to the surface—adhesion is not dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is positive. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

#### the Metco\* Systems

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The Metco Systems provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



	Metallizing Engineering Co., Inc.  1143 Prospect Ave., Westbury, L. I., New York · cable: METC in Great Britain.  METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, Engla
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When inquiring check CP 7731 opposite last page

# new literature

Self-priming chemical pumps discussed in bulletin

Design features and applications of heavy-duty self-priming chemical pumps are described and illustrated in four-page Bulletin 210-2 issued by Lawrence Pumps, Inc., Dept. CP, 371 Market Street, Lawrence, Massachusetts. When inquiring specify CP 7732 opposite last page.

## Guide to control system for water distribution

Controlling pumping station flow and pressure is outlined in two-page engineering data sheet on water distribution. Simple control system for operating three pumps in response to both flow and pressure is schematically illustrated. Head capacity curves for three-pump station are shown.

AED 831-27 is issued by The Foxboro Company, Dept. CP, 174 Neponset Ave., Foxboro, Mass. Specify CP 7733 opposite last page.

# Properties and performance of barrier compounds

Moisture- and vapor-proof barrier compounds for various corrosion-resisting services are discussed in four bulletins.

First bulletin details typical properties and gives results of performance tests of weather-proof barrier for application over high-temperature insulation, walls, and other areas. (Nokorode Seal Perm).

Second bulletin discusses material to be used as a bedding compound with application directly on vessels to be insulated and between layers and joints of low-temperature insulation. Typical properties and performance are covered. (Nokorode Low Temp).

Third bulletin describes typical properties and uses of a hot-applied asphaltic enamel designed for waterfront and underwater service. (Nokorode E Kote).

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

Fourth bulletin covers typical properties and performance of an asphalt-base mastic composition containing a high volume content of screened ground cork and a small amount of long fiber asbestos. This abrasion- and fire-resistant coating acts as a weather and vapor barrier and also helps prevent heat losses from equipment to which it is applied. (Nokorode K Kotè).

Buls on Nokorode Seal Perm, Low Temp, E Kote, and K Kote are available from Lion Oil Company, Dept. CP, El Dorado, Arkansas. When inquiring specify CP 7734 on handy form opposite last page.

# Gives specifications, properties of non-phthalate plasticizer

Specs, typical properties, compatibility, lowtemp properties, heat stability, plastisols, and toxicity studies of a plasticizer for vinyl resins and other film-formers are presented in threepage data sheet. Compound is the dibenzoate ester of a dipropylene glycol.

"Benzoflex 9-88" is issued by Tennessee Products & Chemical Corp., Inc., Dept. CP, 1st American National Bank Bldg., Nashville 3, Tenn. When inquiring specify CP 7735 on handy form opposite last page.

# Eleven regulating valves shown in bulletin

Illustrated four-page bulletin in two colors shows cleven automatic regulators for use in heating, power generating, industrial processing. Pressure limits, materials, applications are detailed. Included are descriptions of valves which can reduce pressures from 6000 psi to 100 psi.

"Regulating Devices" is issued by the Atlas Valve Company, Dept. CP, 280 South St., Newark 5, New Jersey. When inquiring reader may simply check CP 7736 on handy Reader Service slip located opposite last page.

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# Covers over 100 uses for magnets

Case histories, highlighted by photographs, explain how various companies are using permanent, non-electric magnets to prevent iron contamination in their products, protect their machinery from tramp iron, and prevent fires. Written in non-technical style, 24-page booklet covers over 100 uses for the magnets.

Booklet B-213 is issued by Eriez Manufacturing Company, Dept. CP, 13 Magnet Drive, Erie 6, Pa. Specify CP 7737 opposite last page.

#### Rapid "figurin" " charts for desk tops

Having the same accuracy as a seven-and-one-half inch slide rule, two mathematical charts can be read directly without use of a straight edge. Multiphase chart includes scales for multiplication, division, square root, cube root, logarithms. Second chart has same pattern for multiplication and division but is without log, square and cube root curves. Suitable for desk tops, values can be read without slide settings.

To obtain mathematical charts remit 25c direct to E. J. George, Dept. CP, 428 E. Magnolia Ave., Aldan, Delaware County, Pa.

# Engineering data on filters of porous stainless

Range of stock filters available with porous stainless steel elements and application data are contained in four-page bulletin. Complete data are provided to enable specification of non-stock filters of standard design to suit definite applications. Standard design filters for pressures up to 10,000 psi are also described.

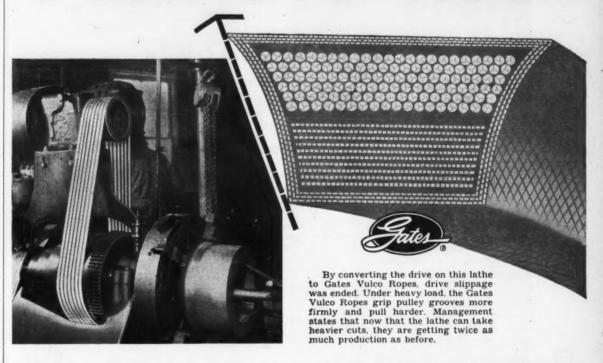
Bul 213 is available from Micro Metallic Corp., A Pall Filtration Co., Dept. CP, 30 Sea Cliff Ave., Glen Cove, N.Y. When inquiring specify CP 7738 on handy form opposite last page.

# Annotated bibliography on hexachlorophene

References and abstracts on 136 scientific and trade articles, and abstracts of 19 foreign and domestic patents are presented in annotated bibliography of G-11® hexachlorophene.

Bul H-1 is issued by Sindar Corp., Dept. CP, 330 W. 42nd St., New York 36, N.Y. When inquiring specify CP 7739 opposite last page.

# "Secret" of lower belt costs is concave sides





Plants that keep track of costs on drives know this: they get longer wear at lower cost per year of service when they specify Gates Vulco Ropes—the V-Belts with concave sides.



Here's WHY concave sides keep belt costs down:

When the Gates belt is bent around the sheave, the precisely

engineered concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley.

This full, uniform contact assures even distribution of wear. Naturally, even wear means longer wear. And longer wear cuts belt replacement costs...reduces down time...contributes to profits.



Prove to yourself the value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. You see immediately that the bulging sides prevent an even fit in the

pulley groove (Fig. 2-A). Uneven contact causes faster wear...increases belt replacement costs.

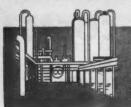
Reduce costs and down time for belt replacements—specify Gates Vulco Rope Drives—the V-Belt with concave sides (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—World's Largest Maker of V-Belts.

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 46 - A



When inquiring check CP 7740 opposite last page



# **Processing** and Engineering Data



121

#### Surface Tension of Oils

By D. S. DAVIS

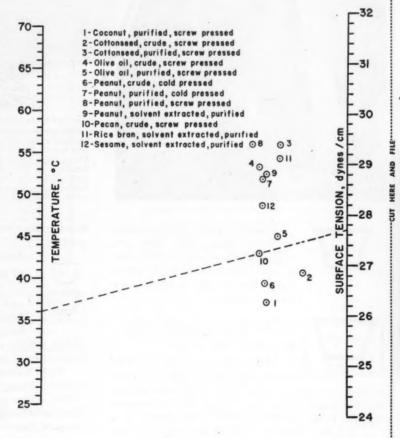
Professor of Chemical Engineering Virginia Polytechnic Institute

Knowledge of surface tension of oil at various temperatures is valuable in preparing emulsions. This nomograph, based on recent data<sup>3</sup> and constructed by methods previously described1, 2, produces rapid, reliable estimates of surface tension of a dozen oils at temperatures from 25 to 70°C.

Broken line shows that surface tension of crude, screwpressed pecan oil is 27.7 dynes per centimeter at 36°C.

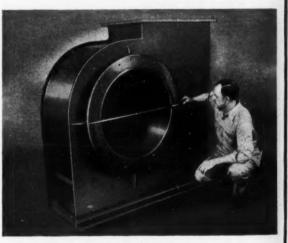
#### LITERATURE CITED

- (1) Davis, D. S., "Empirical Equations and Nomography, Chap IX, McGraw-Hill Book Co., New York (1943).
- (2) Davis, D. S., "Nomography and Empirical Equations," Chap X, Reinhold Publishing Corp., New York (1955).
- (3) SINGLETON, W. S. and BEN-ERITO, RUTH R., Jour AOCA, Vol 32, No. 1, p 23 (1955).



(POLYETHYLENE) (NON-PLASTICIZED) Agile's high-grade modern thermoplastic

construction materials — AGILENE and AGILIDE—fabricated by a unique combination of forming and welding processes in which we specialize, are your safeguard for an economical and properly engineered installation.



AGILIDE centrifugal fans are corrosion-proof throughout. All parts, including the rotor, are fabricated entirely from AGILIDE. There is no chance of crevice corrosion or coatings to chip or peel.

The 30" dia. inlet fan pictured above delivers 15,000 cfm. AGILIDE fans are available with direct or belt drives, weatherproof hoods, and various discharge positions.

American Agile Corporation DEPT C-1

When inquiring check CP 7741 opposite last page

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CHEMICAL PROCESSING

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#### Calcium carbonate fillers for vinyl chloride resins

Typical physical properties obtainable with Witcarbs, precipitated calcium carbonate, are detailed in two-page data sheet. Possibilities of cost reduction with minimum effect on physical properties by using Witcarbs V & P in filling vinyl chloride resins are suggested.

Bul W-2 is available on letterhead request from Witco Chemical Co., Dept. CP, 260 Madison Ave., New York 16, N.Y.

#### Corrosion-resistant nickel alloy properties and applications

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Revised bulletin of 64 pages features applications of Ni-Resist, corrosion-resistant nickel-alloyed cast iron. Mechanical and physical properties offered by eight types of the alloyed material are tabulated. Section on corrosion data compares material to gray cast iron under 400 different industrial conditions.

Bul A-71 is available from The International Nickel Co., Dept. CP, 67 Wall St., New York 5. N.Y. Specify CP 7742 opposite last page.

#### High-speed, low-cost packaging of many products described

Application of company's automatic machinery to achieve high-speed, low-cost packaging of a wide variety of products is described and illustrated in eight-page folder. Feed mechanisms to handle liquid, semi-liquid, granular, and powdered products are detailed along with listings of typical products now being packaged by the machines. Data is given on package types, sizes, and the many kinds of packaging materials which can be handled.

Folder P-801 is issued by Stokes & Smith Company, Dept. CP, 4992 Summerdale Ave., Philadelphia 24, Pa. When inquiring specify CP 7743 on handy form opposite last page.

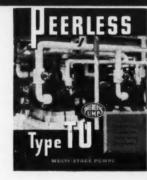
#### Indicating silica gel

Silica gel that changes from dark bluish-green at 0.1% RH to pale yellow at 4% RH and can be reactivated and reused many times is subject of single-page data sheet available from Davison Chemical Co., a Div. of W. R. Grace & Co., Dept. CP, 101 N. Charles St., Baltimore 3, Md. When inquiring specify CP 7744 opposite last page.

# either way you look AT THE

### PUMPING PROBLEM







#### PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

Factories: Los Angeles 31, Calif., and Indianapolis 8, Ind. Offices: New York; Atlanta; Chicago; St. Louis; Indianapolis, Ind.; Phoenix; Fresno; Los Angeles; Plainview and Lubbock, Texas; Albuquerque, New Mexico.

Distributors in Principal Cities. Consult your Telephone Directory.



# izontal



#### PERFORMANCE-PROVED PEERLESS PUMPS WILL DO THE JOB BETTER

Here's why-You can choose from either Peerless vertical or Peerless horizontal designs for most every liquid transfer job -water or process liquids. You can select the pump you need from the broadest range of heads, capacities and horsepowers.

You can buy and apply a Peerless pump with the confidence that it will provide dependability over the years.

Bulletin B-1700, at the top above, describes Peerless vertical can type process pumps. Bulletin B-1400 just above describes multi-stage horizontal pumps for high pressure liquid transfer.

Write for your copies. You'll find out how Peerless pumps can squarely meet your pumping needs with economy, efficiency and dependability.

PEERLESS PUMP DIVISION Food Machinery and Chemical Corporation 301 West Avenue 26, Los Angeles 31, California

Please send bulletins checked below: PEERLESS HYDRO-LINE
CAN TYPE PUMPS (B-1700)

PEERLESS MULTI-STAGE
HORIZONTAL PUMPS (8-1400)

NAME			
COMPANY			
ADDRESS			
CITY	STATE		
		CHEM	DD

When inquiring check CP 7745 opposite last page



## Processing and Engineering Data



1220

#### PUMP SELECTION

- A Method Based on Power Costs

By DUKE SILVESTRINE Allis-Chalmers Manufacturing Co.

Nomograph by BRUCE FADER Associate Editor

Using an oversize pump that happens to be handy is often false economy. Installation can operate at such low efficiency that correctly sized pump could pay for itself in a year out of savings in operating cost.

An indication of power waste in using an oversize pump is evident in pump efficiency curves - as shown in any pump catalog. Actual cost, when efficiency of pump is known, can be quickly estimated with this nomograph. Horsepower for specific pumping job, along with approximate power costs, is based on gallons per minute, working head, and efficiency of pump.

Figured for a duty cycle of fifty 40-hour weeks with power at two cents a kilowatthour, power costs can be calculated for any known duty and power cost data. Nomograph is based on three equations:

BHP = 
$$\frac{H \times gpm \times p}{3960 \, \gamma}$$

3960 = 33,000 ft lb/min

apm × H 3960 × BHP

where -

BHP = brake horsepower	hp
$\eta = \text{efficiency of pump}$	%
gpm = pumping rate	gpm
H = head in feet of fluid pumped	ft
$\rho = \text{specific gravity}$	-

These equations are general; they do not refer to any one type of pump.

Three simplifying assumptions are made. First, nomograph is based on pumping water (specific gravity of 1.0). Second,

Chemical Processing - June 1955.

suction head is not taken into account. Third, motor efficiency is taken as 100%. Where pump efficiency is not known, and catalog data are not available, wattmeters in motor circuit can be used to determine it. Multiply wattmeter reading by 1.34 to obtain brake horsepower and calculate efficiency from equation above. Using a motor efficiency of 100% gives savings figures which are conservative - savings are greater than those shown when motor and line losses are considered.

#### Typical Example

Suppose 90 gpm of water must be pumped against a 140 ft head.

Pump available for this job will operate at 45% efficiency under these conditions. A new pump suitable for this job will operate at 65% efficiency. Based on energy cost of 2 c/kw-hr and a duty cycle of fifty 40-hour weeks, what yearly savings can be attained by using the more efficient pump?

Connect 90 gpm rate and 140 ft head on appropriate scales with a straightedge. Extend line to the reference line. Pivot straightedge on this point to pass through 45 and 65% efficiencies successfully. Note that less efficient pump requires seven horsepower; more efficient pump requires less than five. In terms of power cost per year, figures are \$210 and \$143. Annual saving on this basis is \$67.

Note that actual savings will be greater than this because of lowered losses in line and motor. Salvage value of "wrong" pump (correctly applied in the future) must also be allowed.

# Two hoses for your tough jobs



# **Corrosion-proo**

You get the advantages of a Teflon® compound in flexible hose form with FLUORO-FLEX\*-T Hose and Assemblies, Chemically inert and with 304 stainless braid, the hose can handle all acids and all caustics in any concentration . . . all other chemicals . . . all gases and vapors . . . steam . . . synthetic oils and fuels . . . foods . . . at any temperature from -100°F to +500°F and up to 1000 psi. Available up to 11/4" I.D.



# Solvent-proof

RESISTOFLEX SUPER-SOLVENT HOSE makes the ideal transfer hose for water-insoluble chemicals . . . especially for drycleaning fluids. It has a compar tube which is wholly unaffected and impermeable to hydrocarbon solvents of even the most active type which can attack ordinary elastomeric compounds. Available up to 1½" I.D.

Write for Bulletin and data sheets. DuPont trade mark \*Resistoflex trade mark

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P.S. Mfrs. also of TEFLON, KEL-F and FLUOROTHENE rods, sheets, tubes, mechanical parts, and laminated pipe.

When inquiring check CP 7746 opposite last page

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#### Illustrates nickel-copper steel uses

Wide applications of nickel-copper high strength low alloy steels are presented in 48-page illustrated booklet. Working methods, mechanical properties, compositions and availability of seven steels of this class are given. Numerous tables and charts are included.

"Nickel-Copper High Strength Low Alloy Steels" is available from The International Nickel Company, Inc., Dept. CP, 67 Wall St., New York 5, N.Y. When inquiring specify CP 7747 on handy form opposite last page.

## Describes receiver-recorder for remote transmitters

Receiving and recording measurements from one to four remote electric and pneumatic transmitters are illustrated in 12-page bulletin. Operating components are keyed and described. Typical measuring circuits are suggested. Applications listed include gas analysis, pressure, temperature, conductivity, smoke density, and flow.

Bul E 12-5 is available from Bailey Meter Company, Dept. CP, 1050 Ivanhoe Road, Cleveland 10, Ohio. When inquiring specify CP 7748 on handy form opposite last page.

# Nine flow sheets for monitoring-controlling viscosity of petroleum products

Describing methods for controlling viscosity within  $\pm 1\%$ , eight-page bulletin includes nine flow diagrams in two colors. Slanted toward petroleum uses, flow charts illustrate typical applications. Methods for controlling blending, product separation, refining are shown. Automatic temperature compensation is featured for single or multipoint systems.

Form BUV4 is available from Cincinnati Div., Bendix Aviation Corp., Dept. CP, 203 W. Third St., Cincinnati 2, Ohio. When inquiring specify CP 7749 on handy form opposite last page.

## Plastic pipe made to specs described in bulletin

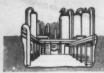
Flexible, lightweight plastic pipe and fittings which are made to specified diameters and wall thicknesses are described in four-page bulletin.

Bul PG-190 is available from Acme Rubber Manufacturing Company, Dept. CP, Meade St., Trenton, N.J. When inquiring specify CP 7750 on handy form opposite last page.



When inquiring check CP 7751 opposite last page

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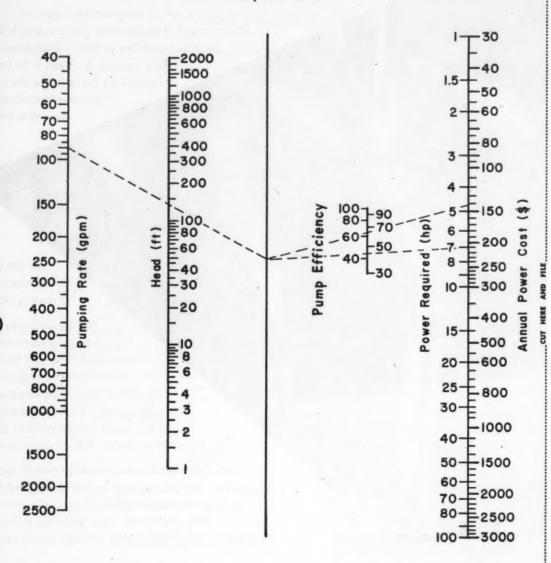


# Processing and Engineering Data



122b

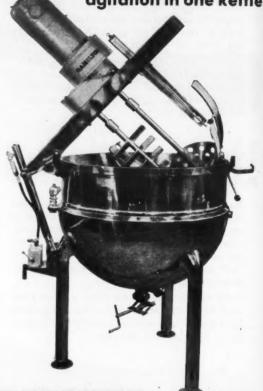
**Pump Selection** 



BASIS: Fifty 40 hour weeks, power at 2 \$ / kw hr.

Chemical Processing - June, 1955

NOW... you just throw a lever and get single or double motion agitation in one kettle



THE HAMILTON STYLE-DP

MIX COOKER'S primary agitator, with nylon scrapers, runs continuously when agitator is in operation, but the secondary agitator can be turned on or off independently, even while mixing. Agitators are easily and quickly removed to facilitate cleaning and to provide quick changeover to any one of four types of secondary agitators. Totally enclosed motor, either constant speed or variable speed. Stainless

steel kettle incorporates every sanitation feature. Hydraulic lift for agitator and thermometer bracket are optional. Style-DP agitator unit can be used with three other styles of Hamilton kettles, so you're sure to obtain the exact mix cooker to fit your needs.



eakage Problems This exclusive featur diminates contamina tion warries leve n gear box contro



Write for Data Sheet H-16, Dept. D

Hamilton copper and brass works Division of the Brighton Copper Works, Inc. • 820 State Ave., Cincinnati, O.

When inquiring check CP 7752 opposite last page

CHEMICAL PROCESSING

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# Shows acid-resistant work clothes of Orlon and Dynel

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Catalog shows safety clothing made of Dynel and Orlon. It gives laboratory reports on action of various chemicals on both of the materials. Immersion test data are provided in three-page section.

Booklet on Orlon and Dynel Clothes is available from Resistall Work Clothes, Inc., Dept. CP, 204 E. 23rd Street, New York 10, N. Y. When inquiring specify CP 7753 opposite last page.

# Rotary pumps for all industries detailed in series of bulletins

Positive-displacement rotary pumps for a variety of industrial applications are described and pictured in a series of bulletin sections. Section B deals with general-purpose pumps; Section C with heavy-duty units; Section D with Underwriter pumps for handling hazardous liquids; Section E with jacketed pumps; and Section F with sanitary pumps. A sixth bulletin section, K, presents engineering data on rotary pumps.

Bulletin sections on rotary pumps and engineering data are available from Viking Pump Co., Dept. CP, Cedar Falls, Iowa. When inquiring check CP 7754 opposite last page.

# Heavy thickness in fewer coats for longer protection

Modified phenolic protective coatings which give thicknesses of 10 mils per brush or spray coat are described in four-page bulletin. Also detailed are company's testing program, areas where coatings are recommended, classes of industries and applications where coating system is used, and a description of each of the coating's modifications.

Bul 600 is available from Carboline Company, A Div. of Mullins Non Ferrous Castings Corp., Dept. CP, 331 Thornton Ave., St. Louis 19, Mo. Or check CP 7755 opposite last page.

# Direct-writing recorder described — ±3% response to 900 cycles

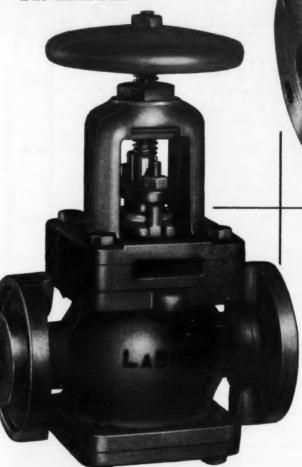
Featuring an oscillographic recorder with frequency response to 900 cps, four-page bulletin gives detailed description of unit.

"Oscillographic Recorder" is issued by Technology Instrument Corp., Dept. CP, 531 Main St., Acton, Mass. Specify CP 7756 opposite last page.

# a new line - an old name

# LABOUR VALVES

Any old-timer—and most newcomers in the chemical industry will tell you that LaBOUR means rugged dependability in chemical service. That reputation, earned over more than 30 years and the toughest jobs the process industries had, is too valuable to risk.





That's why you know you can depend on LaBOUR valves, recently introduced after the most critical testing in laboratory and field. Both globe and check valves are available—built for chemical service, not just made of corrosion resistant materials.

Ask for Bulletins H-1 and H-2.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

# LABOUR VALVES

THE LABOUR COMPANY, INC. \* ELKHART, INDIANA, U.S.A.



When inquiring check CP 7757 opposite last page



#### Processing and Engineering Data



123

### Thermal Conductivity of Liquids

By D. S. DAVIS

Professor of Chemical Engineering Virginia Polytechnic Institute

Recent data<sup>2</sup> show that thermal conductivity for many liquids is linear with temperature over wide ranges. Nomograph presented here is based on this relationship and was constructed by methods previously described<sup>1</sup>.

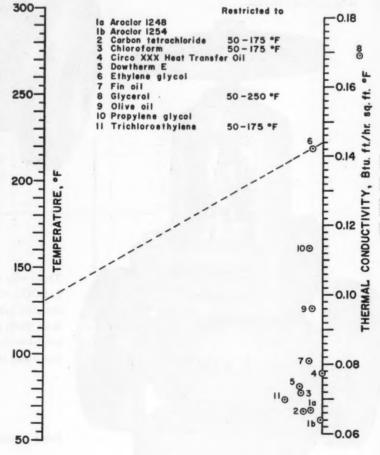
#### **Typical Example**

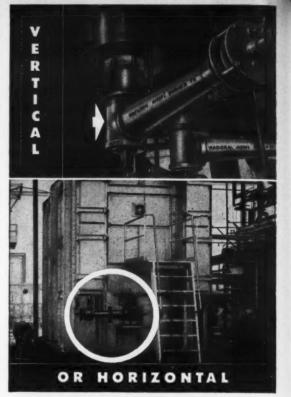
What is the thermal conductivity of ethylene glycol at 130°F? Connect 130 on temperature scale with point 6 for ethylene glycol. Note that straight line thus established intersects thermal conductivity scale at 0.144 Btu/ft/hr/sq ft/°F.

#### LITERATURE CITED

(1) Davis, D. S., "Empirical Equations and Nomography," Chap IX, McGraw-Hill Book Co., Inc., New York (1943).

(2) WOOLF, J. R., and SIBBITT, W. L., Ind Eng Chem, Vol 46, p 1947 (1954).





# many more hours on stream without forced shutdown with NATIONAL AIROIL OIL-GAS TANDEM COMBUSTION UNITS

Exclusively for vertical firing, the new National Airoil VERTI-CAL Tandem Block Units retain all the features of our regular horizontal Tandem Units . . . plus: special, pre-cast refractory shapes for easier, cost-saving vertical installation and maintenance; secondary air inlet louvres for positive control of vertical flame pattern; and, all steel duplex detaching gear which enables swift, simple vertical burner changeover.

VERTICAL and HORIZONTAL Tandem Units hold air in the combustion zone until fuel and heated air are thoroughly mixed. This means that ignition takes place in a hot zone; the result: high fuel economy through more rapid combustion with a minimum of excess air. NATIONAL AIROIL's patented Tandem Combustion Units allow secondary air to be easily and accurately controlled. By adjusting air control louvres, flame can be shaped to radiate heat uniformly without tube impingement.

The VERTICAL or HORIZONTAL Tandem Unit is always fired with NATIONAL AIROIL Combination Oil and Gas Burners... has a high turndown ratio with a steady flame temperature using either fuel oil or gas. With the TANDEM UNIT'S clean flame, a cold furnace can be brought to full capacity in a short time.

pacity in a short time.

"Many, many more hours on stream, without shutdown"...
yes, YOU will realize higher profits from YOUR heaters when
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When inquiring check CP 7758 opposite last page

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Dept Road CP 7

# Flow sheet shows control of alum proportioning

Showing a flow sheet for automatically proportioning liquid alum to water in a paper mill, two-page data sheet outlines advantages expected in similar installations. System not only paces chemical feed but also provides continuous record of flow information. Applications include fertilizer production, municipal water and sewage treatment, food processing.

Application Memo B-I-F K24 is issued by Omega Machine Co., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence, R. I. When inquiring specify CP 7759 on handy form opposite last page.

# Details research, development activities of company

Details of methods and tools employed, and results achieved by company's research and development services are presented in 22-page illustrated bulletin. Bul I-19 is available from A. O. Smith Corporation, Dept. CP, 3533 N. 27th St., Milwaukee, Wisconsin. When inquiring specify CP 7760 on handy form opposite last page.

# Toggle clamp speeds bending of $\frac{3}{8}$ to $1\frac{1}{2}$ " tube

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Gas

Bench-mounted manual tube bender is described and illustrated in eight-page catalog. Unit described is available with a toggle clamp for easier and speedier operation. Toggle clamp, without shoe insert, accommodates tubing of  $1\frac{1}{2}$ " OD. Shoe inserts are available for tubing sizes from  $\frac{3}{8}$  through  $1\frac{1}{4}$ " OD.

Cat 1141A10 is available from Tube & Hose Fitting Division, Parker Appliance Co., Dept. CP, 17325 Euclid Ave., Cleveland 12, Ohio. When inquiring specify CP 7761 opposite last page.

## Automatic, limit controls are shown

Describing limit controls usable in electrical control system, 12-page booklet includes controller circuit diagrams. Details are given for pyrometer controls and units for automatic response to changes in current or voltage.

Bul G-7 is issued by Assembly Products, Inc., Dept. CP, County Line Road and Wilson Mills Road, Chesterland, Ohio. When inquiring specify CP 7762 on handy form opposite last page.



RECEIVING

As the materials are received, they are picked up by scoops and cascaded from the top of the machine. At the same time, the revolving drum forces the materials from both ends toward the center of the drum . . while the swinging chute, which is in mixing position, produces a fourth lateral mixing action.



DISCHARGING

By simply throwing a lever, the inter is closed and the blender is in discharging position. The completely mixed materials drop of the lifting scoops and discharge through chute without segregation of ingredients.

Four separate mixing actions in the Sturtevant Blender assure complete blending of various materials regardless of weights, densities, finenesses, or other physical properties.

This mixing action provides a thoroughly blended product with no substances floating to remain unmixed.

Sturtevant Blenders are available in mixing capacities from 500 to 20,000 pounds. Write for information or engineering assistance.

#### STURTEVANT MILL COMPANY

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Designers and Manufacturers of

CRUSHERS ● GRINDERS ● SEPARATORS ● CONVEYORS ● MECHANICAL DENS

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When inquiring check CP 7763 opposite last page



Niagara Aero Heat Exchangers at a Plant of the Heyden Chemical Corp.

# **Still Operations Improved** by a New Cooling Method

• NIAGARA AERO HEAT EXCHANGERS cool the reflux supply or condense vapors at a vacuum by controlled evaporation of water directly on the heat exchange surfaces.

Liquid or vapor temperatures are always held constant by the Niagara "Balanced Wet Bulb" control method, which automatically varies the cooling effect proportionately to the load. The distillation is therefore uniform throughout all changes in climatic conditions the year around; it is the same in the heat of summer as in the freezing cold of winter. Continuous maximum production is thus insured.

Non-condensibles are effectively separated at the condensate outlet, with notable sub-cooling after separation for greater vacuum pump efficiency.

Use of Niagara Aero Heat Exchangers reduces your operating costs and removes many sources of your troubles in distillation column operation. Ask for new bulletin #120.

#### NIAGARA BLOWER COMPANY

Over 35 Years Service in Industrial Air Engineering

Dept. CP, 405 Lexington Ave.

Experienced District Engineers in all Principal Cities of U. S. and Canada

When inquiring check CP 7764 opposite last page

#### **NEW LITERATURE**

#### Amino acids listed

Nine-page list of 23 frequentlyused amino acids contains information of interest to nutritionists, biochemists, and other lab researchers.

"Merck Amino Acids" is issued by Merck & Co., Inc., Dept. CP, 126 E. Lincoln Ave., Rahway, N.J. When inquiring specify CP 7765 opposite last page.

#### Shows stainless steel pipe fittings

Dimensional specifications of 150-lb stainless steel pipe fittings are presented in four-page bulletin. Fittings described are available in Types 304 and 316 stainless in sizes 1/8 to 2".

Bul S-3-55 is issued by Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Dept. CP, PO Box 95, Roselle, N.J. Specify CP 7766 opposite last page.

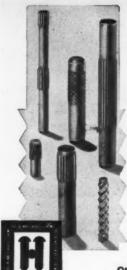
#### **Covers** carbonates

Ethylene carbonate and propylene carbonate are detailed in eight-page technical bulletin. Information is given on physical and chemical properties, solubilities, and applications.

Bul F-8307 is issued by Carbide and Carbon Chemicals Co., div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N. Y. Specify CP 7767 opposite last page.

#### Explains design of lab ovens

Printed in two colors, 12-page binder of information details design of lab ovens, incubators, water baths. "Modernlab Ovens . . ." is issued by Modern Laboratory Equipment Co., Inc., Dept. CP, 1809-11 First Ave., New York 28, N.Y. Specify CP 7768 opp. last page.



#### **CUT FASTENING COSTS** HASSALL THREADED PINS

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- Roll threaded for greater strength

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We are saving many of our customers from 20% to 50% on their special small threaded pins. These threaded pins may be made to your specifications in a wide variety of metals and finishes. Large or small runs are economical

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When inquiring check CP 7769 opposite last page



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ONLY \$545.00 Complete price (No extras to buy)

CONTROLS HUMIDITY 20% to 99% within ± 2% (Depends on Dry Bulb Temperature)

DRY BULB: Ambient to 156° F. within ± 1° F.

Compact, Complete, fully automatic Controlled R.H. offered at low cost. Inverted Pyrex Jar (16"Dx12"H used as work chamber) placed on Stainless Steel Cabinet housing Controls, Motor and Blower. Guaranteed accurate and stable controlled humidity.



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BLUE ISLAND, ILLINOIS

When inquiring check CP 7770 opposite last page

CHEMICAL PROCESSING

Explains pneumatic control for automation

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Using seven schematics, two-color bulletin explains pneumatic method for automatic process control. Schematics show typical applications on variable-speed drives, valves, metering pumps, and electrical components in closed control loops. Specifications for a pneumatic power operator are included in the 12-page booklet.

Bul B-50-2 is issued by the Conoflow Corporation, Dept. CP, 2100 Arch St., Philadelphia 3, Pa. Specify CP 7771 opposite last page.

Five-gal distillation plant is packaged unit

Two-page data sheet lists specifications of component parts, electrical controls, and cooling and heating systems on 5-gal distillation pilot plant. Designed to withstand 150 psi, unit consists of reactor, agitator, condenser, and decanter. Photograph and large labeled drawing of unit are also included on data sheet.

Data sheet on Model 611 pilot plant is issued by The Patterson-Kelley Company, Inc., Dept. CP, 44 Warren Street, East Stroudsburg, Pa. When inquiring specify CP 7772 opposite last page.

# Unit-load method described in 32-page booklet

Illustrated 32-page publication describes in detail unit-load principle of material handling. Power requirements of industrial trucks and characteristics of Edison nickel-iron-alkaline storage batteries are also described. Latest material handling attachments for fork lift trucks are shown in use in many different industries. Time and motion analysis of various transporting systems is presented in two-page section with illustrations.

"Modern Material Handling" is available from Edison Storage Battery Division, Thomas A. Edison, Inc., Dept. CP, 51 Lakeside Ave., West inquiring specify CP 7773 opposite last page.

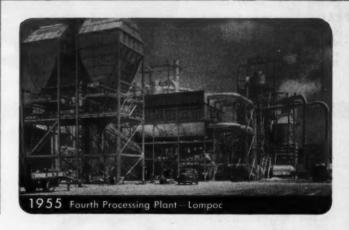
# Translations of German patents on polyurethan resins

German reports on developments in synthesis and processing of polyurethan resins have been translated into English. Bul 100 lists the latest available data, and is issued by Research Information Service, Dept. CP, 53 Nassau St., New York 5, N.Y. Specify CP 7774 opposite last page.

a quarter
of a century
separates
these DICALITE
pictures







They didn't continue very long—the horse-and-wagon, hand-quarrying methods of our early days. For Dicalite was founded on the idea of development, of promoting new uses for that little-known (in 1930) material, diatomite, and working out improved processing methods.

The succeeding 25 years have, we believe, proved the soundness of that idea. Today diatomite . . . also called diatomaceous silica, diatomaceous earth or D.E. . . . has important uses in more than 200 industries, and Dicalite has helped in the pioneering and development of many of these uses. Dicalite products, which now number more than 50, have a valued place in the brewing, pharmaceutical, chemical, sugar, food, paint, paper and other large industries, as filteraids, fillers, insulation and in other capacities.

And Dicalite itself has grown—because of this basic idea of development—from 1930's one deposit, one plant, to 1955's four processing plants and deposits in three states. Four locations, four plants, served by four different railroad systems, insure a continuing, dependable supply of the diatomaceous materials upon which many industries rely.



DICALITE DIVISION, GREAT LAKES CARBON CORP. • 612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA

When inquiring check CP 7775 opposite last page

1838-1955

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TEST RUNS

Designed for capacities beyond those of lab mills and below those required for large-scale crushing operations. Effectively used for wide range of materials. Up-Running Models (for maximum fines); Down-Running

maximum fines); Down-Running (for minimum fines). Equipped with rings or any of a full variety of hammers. Backed by over 40 years experience in building reduction equipment. Write for Catalog on "13" Series Crushers.

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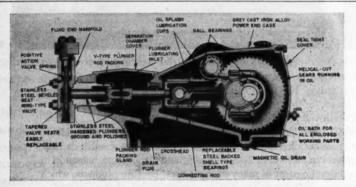
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CRUSHERS

Series

When inquiring check CP 7776 opposite last page



# Working with Acids? High Pressure?

John Bean Reciprocating Pumps are built for these jobs with carbon or stainless steel sectionalized fluid ends for straight-line flew . . . with caramic plungers and ball valves for specialized applications . . . with heavy duty drive ends having Tocco hardened gear teeth and bearing surfaces for continuous operation . . with positive roto-splash lubrication within an enclosed case for dependable sealed-in performance.

Every day these John Bean design features help solve high pressure pumping problems for leading producers of chemical products. They'll solve your problems, tool Study the above diagram. You'll be convinced.

· Capacities from 0.5 to 40 GPM

Operating pressures from 100 to 6,000 P.S.I.



#### JOHN BEAN DIVISION

Lansing 4, Michigan
Please send me your catalog on John Bean
High Pressure Reciprocating Pumps.

Name\_\_\_\_ Firm\_\_\_\_ Principal

Principal Product. Street

Street Zone State

When inquiring check CP 7777 opposite last page

#### NEW LITERATURE

## Hose maintenance check list

Printed in black on a yellow background for easy reading, eleven-point check list highlights four common abuses of hose with drawing. The 8½ x 11" chart of stiff cardboard is designed for wall mounting in plant areas. It is lacquered for protection against dirt and grease.

"Hose Check List" is issued by Industrial Rubber Div., Thermoid Co., Dept. CP, 400 Whitehead Rd., Trenton 6, N. J. When inquiring specify CP 7778 on handy form opposite last page.

# Gives minimum odor to water paints

Twenty-page catalog describes acrylic resin emulsion which gives minimum odor to waterbase paints. Other advantages: ease of application, fast drying, high adhesion, and long film life.

Bul on Rhoplex AC-33 acrylic resin emulsion is issued by Rohm & Haas Co., Dept. CP, 222 W. Washington Sq., Philadelphia 5, Pa. When inquiring specify CP 7779 on handy form opposite last page.

#### ion exchangers as catalysts

Use of ion exchange resins as catalysts is covered in 10-page bulletin. Since ion exchangers may be considered insoluble acids or bases, they promote reactions which are catalyzed by conventional acids and bases. Bibliography covers 2½ pages.

"Ion Exchangers as Catalysts" is issued by Dow Chemical Co., 1000 Main St., Midland, Mich. When inquiring specify 7780 opposite last page.

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11,322 ADVERTISERS IN

# THOMAS REGISTER

Your Where-to-Buy Encyclopedia



When inquiring check CP 7781 opposite last page



When inquiring check CP 7782 opposite last page

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Whatever result you're after—precise sizing, complete deliquefying, longer screen life—Bee-Zee has a screen shaped for the job. Get the entire story on these 100% stainless steel screens that resist abrasion, rust and chemical corrosion. Pick up the phone, dictate a letter or wire us for complete facts. Bee-Zee Screens are welded on highly accurate electronic equipment ... can be fitted to any screening machinery you operate.

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BIXBY-ZIMMER ENGINEERING CO.

765 Abingdon Street, Galesburg, Illinois



Bee-Zee Tri Rod gives you "sharp-as-a-knife" separation when a high degree of accuracy is demanded.

Bee-Zee Round Rod holds its accuracy even when rods are worn halfway through.





Bee-Zee Grizzly Rod combines the best features of round and tri-rod.

Bee-Zee Grizzly Rod with protective skid rod guards against abrasive action without sacrificing efficiency or percentage of open area.





When inquiring check CP 7783 opposite last page

# Antimony paste improves fire resistance

Single-page data sheet discusses antimony concentrate pasté for addition to company's chlorinated polyesters for improving fire resistance.

Bul 18-1 is issued by Finishes Div., Interchemical Corp., Dept. CP, PO Box 659, Newark 1, N.J. When inquiring specify CP 7784 on handy form opposite last page.

# Lists thermo-process problems, suggests typical solutions

Containing solutions to typical pyrometer control probelms, 16-page bulletin includes schematic drawings and general information on pyrometer control systems. Function of oscillator circuit in a pyrometer controller is discussed, along with various control forms which can be developed from this circuit.

Bulletin 9 is issued by Wheelco Instruments Div., Barber-Colman Co., Dept. CP, 1300 Rock St., Rockford, Ill. When inquiring specify CP 7785 on handy form opposite last page.

# Silicone-carbon black grease for high-temp bearings

Performance data in form of illustrated case histories show savings in relubrication schedules, replacement, and maintenance costs resulting from use of a silicone fluid-carbon black mixture designed for high-temp, slow-speed bearings.

"41 Silicone Grease" is issued by Dow Corning Corp., Dept. CP, 592 Saginaw Rd., Midland, Mich. When inquiring specify CP 7786 on handy form opposite last page.

# Low cost is big feature of temp controller

Outlining performance specifications of a low-cost temperature indicator-controller, two-page bulletin includes detailed installation dimensions. Temperature range suggested is 100 to 700°F. Described as positive acting because of the liquid-filled bulb and bellows, instrument is adjustable for bandwidth between one and four per cent of scale.

Bul MC-122 is issued by Fenwal, Inc., Dept. CP, 243 Pleasant St., Ashland, Mass. When inquiring specify CP 7787 on handy form which is located opposite last page.

# versatile / adaptability

... for all fine filtering

# SPARKLER HORIZONTAL PLATE FILTERS



Versatile adaptability make this filter the logical choice of filtration engineers for difficult filtering problems.

Every filtering job usually presents an individual problem involving a combination of various kinds of screens, papers and filter aid. Frequently temperatures are encountered that call for a brine or steam jacketed tank. Linings; plastic or rubber may be needed, with tank and plate metals to fit the product such as mild steel, monel, nickel, stainless steel, bronze or Hastelloy. Constructed to meet ASME specifications when required.

All these structural and material combinations are easily achieved with the Sparkler Horizontal Plate filter.

No fibrous adhesive material is ever required to hold the filter cake on the horizontal plate. The cake is firmly supported on the plate with no danger of cracking or slipping even with a variation in pressure or a complete shutdown in the filtering operation. The patented Sparkler scavenger plate filters almost the last drop in a batch, and allows practically a complete recovery of the product.

Constant filtering quality is maintained from start to the end of the cycle, no break through can occur in a Sparkler Horizontal Plate filter.

What other filter can match this versatility and positive performance under a wide variation of filtering conditions?

Place your filtering problem in the hands of our filtration engineers. They have developed many successful methods of filtering difficult materials and may be able to prescribe a solution to your problem without wasteful experimentation.

Write Eric Anderson for personal attention

#### SPARKLER MANUFACTURING COMPANY

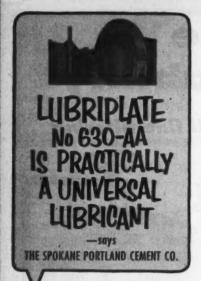
MUNDELEIN, ILL.

Canadian Plant, Galt, Ontario European Plant, Amsterdam, Holland

For ever a quarter of a century; engineers and manufacturers of a complete line of industrial filtration equipment.

When inquiring check CP 7788 opposite last page

NG



"With the introduction of LUBRIPLATE No. 630-AA, we were able to satisfy all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a universal lubricant. Furthermore, it has effected marked savings in both lubricants and labor!"

# TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.



For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



When inquiring check CP 7789 opposite last page

#### NEW LITERATURE

# Clearly-illustrated bulletin features vacuum filters

Principles of operation, performance characteristics, and other technical details of continuous rotary vacuum filters are given in 24-page bulletin. Units feature string discharge which lifts cake in one continuous sheet. Schematic drawings, flow diagrams, and photographs show design, construction, and many applications of the filters. Bul 103-B is issued by Filtration Engineers, Inc., Dept. CP, 155 Oraton Street, Newark 4, N. J. When inquiring specify CP 7790 on handy form opposite last page.

## Specs for 52 meter pumps listed in bulletin

Picturing proportioning pumps ranging in capacity from 0.354 to 3300 gph, 16-page booklet includes tables of detailed specs on 52 pumps. Twelve of the pumps, including a package unit, are illustrated. Automatic control in response to changes in temperature, flow, pressure, pH values is described.

Bul S-1254 is issued by the Philadelphia Pump and Machinery Co., Dept. CP, 1513 Race St., Philadelphia, Pa. When inquiring specify CP 7791 on handy form opposite last page.

# Condensed reference file of plastics and resins

Information on properties and uses of more than 50 of manufacturer's plastics and resins is presented in 12-page reference file. Processing and applications are described. Seventy photographs are included.

"1955 Condensed Reference File of Bakelite Plastics and Resins" is issued by Bakelite Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 300 Madison Ave., New York 17, N.Y. When inquiring specify CP 7792 opposite last page.

#### High-alloy casting data

Engineering data and description of facilities for producing high-alloy static and centrifugal castings are presented in 16-page, two-color, illustrated booklet. Physical properties, alloying combinations, and uses are included.

Bul No. 3354-G is issued by The Duraloy Co., Dept. CP, Scottdale, Pa. When inquiring specify CP 7793 on handy form opposite last page.

# This Pump Lasts Longer on Tough-to-Handle Fluids



No packings, no leakage; positive acting; requires only simple routine maintenance, built of any metal or rubber-lined; 1 to 100 g.p.m.; discharge pressures to 100 p.s.i.

Do your processes require pumping of corrosive, erosive or thick fluids, or quick-settling, heavy or crystalline materials that cause frequent pump breakdowns and replacement? Then the Shriver Diaphragm Pump can really solve your problems. Here are two typical cases:

 Pumping a heavy suspension of emery and water—"Fulfilled the needs of a tough job; simplified layout and installation."

 On amino acids in HCl—"By far the most economical to operate. Time and production loss due to pump servicing now negligible, whereas pumps previously used lasted only a few days at most."

There are many more such reports on the money-saving performance of Shriver Diaphragm Pumps. Write for bulletin 137.

### SHRIVER Diaphragm Pump

#### T. SHRIVER & COMPANY, Inc.

846 Hamilton Street Harrison, N. J.

When inquiring check CP 7794 opposite last page



When inquiring check CP 7795 opposite last page

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# Offers bulk chemicals supplement list

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Supplement to Catalog 115-C, list contains over 100 reagent chemicals available in bulk. Actual analyses reported on each label are given.

"Bulk Chemical List" is issued by Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. When inquiring check CP 7796 on handy form opposite last page.

# Cites advantages of water dealkalizing equipment

Four-page illustrated bulletin discusses process of chloride anion exchange, tells why it is necessary to dealkalize water for boiler feed and for processing, and explains how water can be dealkalized efficiently and economically. Details of operation and advantages of the equipment are told.

Bul 4567 is issued by Cochrane Corporation, Dept. CP, 17th Street and Allegheny Avenue, Philadelphia 32, Pa. When inquiring specify CP 7797 on handy form which is located opposite last page.

# Shows load-cell solutions to weight problems

Illustrating typical applications of load cells and load beams, 20-page bulletin in two-color includes principles of measurement by load cells, specifications of load-sensitive devices, available instrumentation. Tables show maximum percentage error vs. load cell type, and response-linearity vs. capacity. Effects of overload and temperature are discussed. Standard-load-measuring "packages," including instruments, are described.

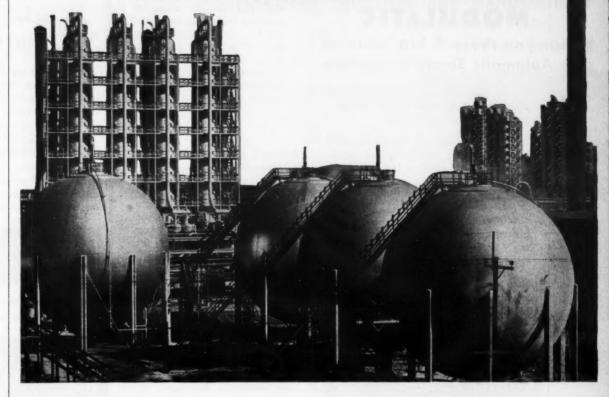
Bul No. 4301 is issued by Baldwin-Lima-Hamilton Corporation, Dept. CP, 940 Simpson St., Philadelphia 42, Pa. When inquiring specify CP 7798 on handy form which is located opposite last page.

# For users of ceramic parts — an engineering guide

Designed for use by purchasers and designers of ceramic parts, 16-page guide explains advantages of engineered ceramics over other materials and specifies ceramics for certain uses.

Bul 42-221 is available from Dept. 65, Centralab, a division of Globe-Union, Inc., Dept. CP, 900 E. Keefe Ave., Milwaukee 1, Wis. When inquiring specify CP 7799 opposite last page.

# PRODUCERS OF CHLORINE USE U. S. PERMOBOND® LININGS



Since Chlorine is produced under highly corrosive conditions and because United States Rubber Company's specially compounded Permobond #5471 proves superior for lining the amalgam type cells plus the piping and process tanks, then you can be sure that U. S. Permobond is the right lining for all chemical processes using this highly corrosive basic chemical.

Any original equipment requiring protection against corrosive attack can be lined with Permobond. You can also have Permobond installed on existing equipment—right in your own plant.

#### U.S. PERMOBOND PROTECTS AGAINST

- WET OR DRY CHLORINE
- TEMPERATURES UP TO 200°F.
- SATURATED CHLORINE SALT BRINE REGARDLESS OF CONCENTRATION

"U. S." has a field force of special sales engineers to solve your corrosion problems. Get in touch with them at the address below.

FROM EVERY STANDPOINT, PERMOBOND #5471 IS THE SUPERIOR LINING.



"U. S." Research perfects it..."U. S." Production builds it... U. S. Industry depends on it.

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Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

When inquiring check CP 7800 opposite last page

# NEED MORE STEAM?

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## MODULATIC

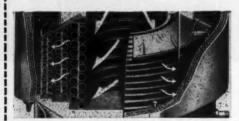
brings you these 4 big features plus Automatic Steam Generation

> Passes complete, as shipped, through plant-type doorways - comes ready to quickly connect and fire up.

Installs anywhere. Just moving a desk makes room, or folding up the watchman's cot, or any aisle will do. Needs no enclosure - no special foundation, expensive stack.

Unequalled for flexibility and rapid pressure recovery—for accurate "tracking" of fluctuating load, up or down. Saves fuel, water, steam.

Standard unit delivers any pressure you select from 5 to 300 p.s.i. (and even higher, when so ordered).



The Vapor Modulatic is clean, quiet, efficient-the economical answer to countless steam needs for heating, power, and processing. Savings from \$1000.00 to \$2000.00 per month are not uncommon. Over 10,000 already in use.

It's time to take a new look at automatic steam generation - to investigate the many Modulātic advantages over conventional boilers. Seven sizes, 18 to 160 h.p. Oil, gas, or flip-switch combination. Proved by 23 years in the world's toughest service. There's nothing else like Modulātic. Ask for 12-page Bulletin 586.



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#### VAPOR HEATING CORPORATION

80 E. Jackson Blvd., Chicago 4, Ill. In Canada: Vapor Car Heating Co. of Canada, Ltd. 65 Dalhousie St., Montreal 3

When inquiring check CP 7801 opposite last page

**NEW LITERATURE** 

#### Lists essential oils and flavors

Latest list of essential oils and flavors is available to those who purchase in wholesale quantities from Fritzsche Brothers, Inc., Dept. CP, 76 Ninth Ave., New York 11, N.Y. When inquiring reader may simply check CP 7802 on the convenient Reader Service slip opposite last page.

#### Research bibliography on phosphate coatings

Advances in technology of applying phosphate coatings to metallic surfaces are described in detail in a nine-volume report of research conducted over the past several years by the Army's Ordnance Corps. Volumes comprising the series explore various phosphating materials and processes.

Volumes on phosphate coatings research, designated PB 111392 through 111400, are available at \$1 per volume from the office of Technical Services, U. S. Dept. of Commerce, Washington 25,

#### Design data and specs on industrial valves

Instruction, operating control, dimensions, and other design data are presented in detail in brochure covering company's line of industrial valves. Units discussed include butterfly, slide, automatic, and proportioning valves. Tables, drawings, and photographs illustrate text.

One page of booklet is devoted to a description of company's RMS-100 high-temperature lubricant.

Brochure on Rockwell Valves is available from W. S. Rockwell Company, Dept. CP, 200 Eliot Street, Fairfield, Conn. Specify CP 7803 which is located opposite last page.



Maybe it's scrap rubber or lumber trimmings. Maybe it's plastic materials. Maybe it's fiber glass. Maybe it's metal.

Whatever is reducible can be ground in Bauer Mills-in large or small quantities-to any degree of fineness.

If you're doubtful about grinding your particular material, we'll make tests in our research laboratories and give you the answer.

We manufacture attrition mills. breakers, crushers, hammer mills. laboratory mills, granulators, texturizers, fiberizers, cleaners, classifiers, exhausters. All of these machines perform the operations indicated by their names.

FIG. 6061

The full line is illustrated and described in our Bulletin No. 52. Shall we send you a copy?



THE BAUER BROS. CO. 1728 Sheridan Ave. . Springfield, Ohio

Established 1878

When inquiring check CP 7804 opposite last page



Outlasts all others...Permits Field Repair



Contact our nearest office or write Dept. &C for catalog.

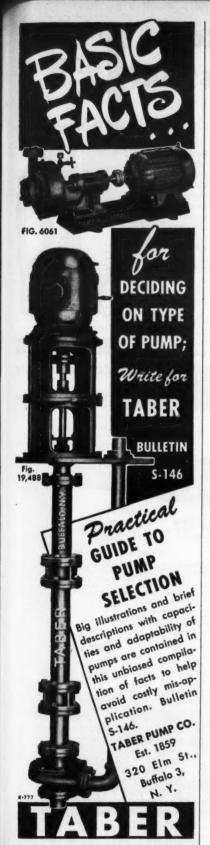
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FECTING SERVICE Home Office and Factory) 332 Atando Ave.

When inquiring check CP 7805 opposite last page



When inquiring check CP 7806 opposite last page

# Explains treating of concrete with sodium silicate

Folder covering the subject of treating concrete explains sodium silicate's function of penetrating concrete surfaces to set-up hard "gel formations" within cell pores.

"Treating Concrete With O® Silicate" is available from Philadelphia Quartz Company, Dept. CP, Public Ledger Building, Philadelphia 6, Pa. Specify CP 7807 opposite last page.

# Demonstrates stereomicroscopy with 3-D anaglyphs

Demonstrating the use of 3-D microscopes, 38-page booklet in two colors features three photographs to be observed through enclosed viewer that produces a 3-D effect. Value of wide-field, three-dimensional magnification for assembly and inspection operations is explained. Ten-question model-selector card is included for determining proper stereomicroscope for specific work. Optical specifications are listed.

Catalog D-15 is issued by Bausch & Lomb Optical Co., Dept. CP, 635 St. Paul St., Rochester 2, N.Y. Specify CP 7808 opposite last page.

# Dryer is recommended for heat-sensitives

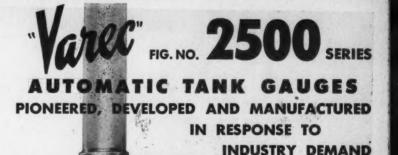
Construction, design, and operation of doublecone vacuum dryer, which tumbles end-sver-end while it dries, is detailed in four-page illustrated bulletin. Units are recommended for drying temperature-sensitive and easily-oxidized materials.

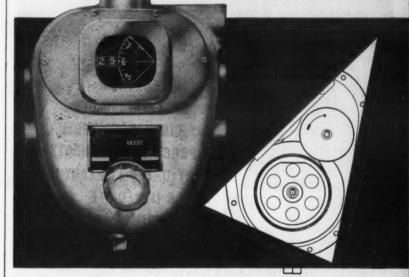
"Conaform Vacuum Dryer" is issued by The Patterson Foundry and Machine Company, Dept. CP, 41 Helene Street, East Liverpool, Ohio. When inquiring specify CP 7809 opposite last page.

#### Data on lignin-rubber coprecipitate

Indulin 70-GR-S, coprecipitate of lignin and butadiene-styrene copolymer (GR-S-1500), is subject of detailed treatment in eight-page technical bulletin. Dealing with properties of the coprecipitate when additional rubber is used, bulletin also outlines methods of processing to secure stocks of lower loadings.

Bul #202 is issued by Polychemicals Div., West Virginia Pulp & Paper Co., Dept. CP, PO Box 832, Charleston, S.C. When inquiring specify CP 7810 on handy form opposite last page.





Positive, convenient, mechanical counter reading combined with dependable accuracy—no smudgy, graduated tape to read through a cloudy glass.

The VAREC Figure No. 2500 Series Gauges have been developed, over a period of several years, in response to urgent field requests for a dependable automatic tank gauge which would eliminate difficulties universally encountered with tape reading, counterweight type gauges. The instrument now offered represents the results of sincere effort on the part of VAREC engineers, invaluable and deeply appreciated customer-cooperation, and experience gained from over 2000 installations covering practically every conceivable field operating condition.

Successfully incorporated in this gauge are such features as (1) liquid level indication on a mechanical counter arrangement for ease of reading, (2) operation checker, (3) gravity compensator, (4) simple calibration and gravity compensator adjustment from outside the gaugehead. Never neces-

sary to gain access to tape, loosen support brackets or make adjustments in the presence of dangerous tank vapors, (5) provision for convenient addition, at any time, of auxiliary equipment such as mechanical limit or control switches, programmers, VAREC Remote Reading Gauger Transmitters, etc., (6) corrosion resistant materials of construction, as typified by the use of specially made Type 316 stainless steel ball bearings, and (7) all metal construction of components which insures electrical ground to tank shell.

The VAREC Figure No. 2500 Series Tank Gauges are now available for higher pressures (up to 300 P.S.I. working pressure) and, as is the case with the low pressure model, a combination of sound design, quality materials, and rugged construction is offered — not construction which meets only minimum requirements at a price.

Investigate before investing. Cheaper equipment is not always the least expensive equipment.

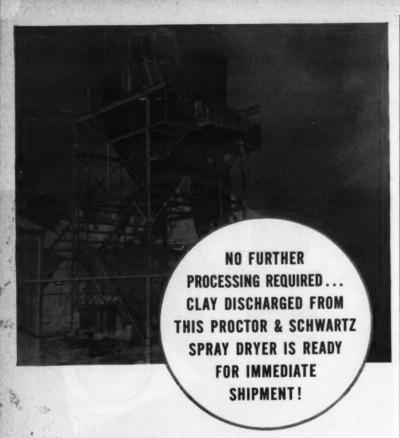
#### VAPOR RECOVERY SYSTEMS COMPANY

2820 N. Alameda St., Compton, Calif.
Cable address: VAREC COMPTON Calif. (U.S.A.) All Codes

961-8

When inquiring check CP 7811 opposite last page

NG



Typical of Proctor & Schwartz low-cost, easy-to-erect spray drying systems, is this installation of the Georgia Kaolin Co. at Dry Branch, Ga. The Georgia Kaolin dryer discharges a high-density, free flowing product that is ready for immediate packaging or shipment.

Flexibility of Operation—Because of its simplified construction and the small quantity of product retained in the system, the dryer offers wide flexibility and adjusts to specification instantly.

Automatic Control-All operations are automatic with mechanical feeds.

Profits go up-The dryer not only combines high thermal efficiency with the convenience of outside location, but the initial cost of equipment per pound of dried clay is low, and operating costs are drastically reduced.

Customer Confidence—These spray dryers are a direct result of the confidence that customers such as Georgia Kaolin have placed in Proctor & Schwartz engineering and manufacturing facilities. This faith has been justified through the many innovations and refinements Proctor & Schwartz have made in spray drying, and which now give higher quality output and greater drying efficiency on the job, as guaranteed.

OTHER TYPES OF PROCTOR & SCHWARTZ DRYING EQUIPMENT . Tray Dryers . Truck Dryers • Continuous Conveyor Systems • Pre-forming Feeds • Spray Drying

#### PROCTOR & SCHWARTZ, Inc.

Manufacturers of Industrial Drying Equipment and Textile Machinery Philadelphia 20, Pa.

When inquiring check CP 7812 opposite last page

#### **NEW LITERATURE**

#### **Epoxy resin adhesives** covered in brochure

Latest technical data on line of epoxy resin adhesives is covered in 16-page brochure. These adhesives have been formulated for bonding metals, wood, glass, ceramics, hard rubber, and thermosetting plastics. Tensile strengths up to 4500 psi with steel, and 3000 psi with aluminum have been obtained.

"Epoxy Resin Adhesives" is issued on direct letterhead request to Armstrong Products Co., Dept. CP, PO Box 1, Warsaw, Ind.

#### Catalogs liquid heaters for process industries

Operating principles, specifications, and dimensions of liquid heaters for the process industries are presented in eightpage bulletin. Units described, operating on the principle of forced recirculation, provide process system temperatures to 750°F with tolerances of plus or minus 2°F.

"Thermal Liquid Heaters" is issued by The International Boiler Works Co., Dept. CP, 216 Elm St., East Stroudsburg, Pa. Specify CP 7813 opposite last page.

#### **Technical information on** sodium phosphates

General information, properties, and applications of industrial sodium phosphates are presented in 38-page booklet. This booklet is one of the most technically complete of any of the commercially published pieces of literature on this group.

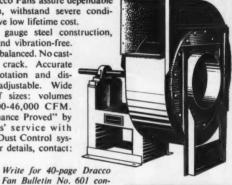
"Sodium Phosphates" is issued by Inorganic Chemicals Div., Monsanto Chemical Co., Dept. CP, 1700 S. 2nd St., St. Louis 4, Mo. Specify CP 7814 opposite last page.

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# Graphite as process material in the chemical industries

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STREET

The growing significance of synthetic graphite in electrometallurgy and electrochemistry is due to its distinctive chemical and physical properties and to continuing advances in process technology of its production and application. Sixteen-page illustrated booklet tells the story.

"Engineered Performance" is issued by Electrode Div., Great Lakes Carbon Corp., Dept. CP, 18 E. 48th St., New York 17, N.Y. When inquiring specify CP 7817 opposite last page.

# Shows motor control systems, components by hp rating

Listing many motor-control applications, 68-page catalog of general-purpose control devices includes special section correlating control components by motor hp rating. Booklet contains wiring diagrams, dimensions of motor starters, details on contactors, relays, solenoids, switches, push buttons, and pilot devices. Information also compares applications and merits of manual and magnetic control, across-the-line and reduced-voltage control.

GEC-1260A is issued by General Purpose Control Dept., General Electric Company, Dept. CP, 1 River Road, Schenectady 5, N. Y. When inquiring specify CP 7818 opposite last page.

# Technical data sheets on vinyl stabilizers

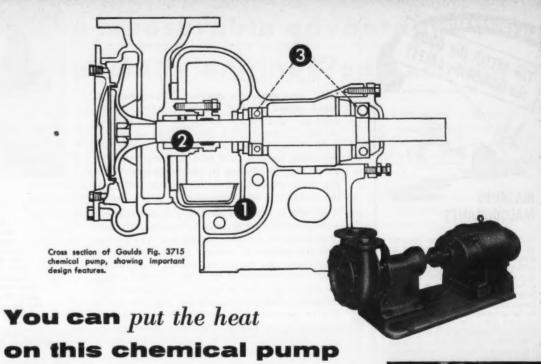
Organo-tin stabilizer Advastab T-72 and barium type stabilizer BA-13P are individually described in two data sheets. Compounds are designed for use in vinyl products.

Buls T-72 and BA-13P are issued by Advance Solvents & Chemical Corp., Dept. CP, 245 Fifth Ave., New York 16, N.Y. When inquiring specify CP 7819 opposite last page.

# Covers automatic flow control of non-Newtonian liquids

Explaining control of non-Newtonian flow, 12page booklet features applications of rheometer. Suggested methods include manual and automatic control. Systems for controlling thixotropic liquids are included.

"Viscometers" is issued by Drage Products, Inc., Dept. CP, 406 32nd Street, Union City, N. J. Specify CP 7820 opposite last page.



Handling hot, corrosive, or abrasive liquids is what the Goulds Fig. 3715 pump is built for.

You can run this pump at 350° F. by cooling the support head (1) and quenching the gland, through fittings that are built in.

And you can get the pump in a variety of materials to meet your particular liquid-handling needs—type 316 stainless steel, Gould-A-Loy 20 (equivalent to ACI CN 7M CU), all bronze, bronze fitted, all iron, or iron or bronze with stainless trim. These materials regularly stocked—other material can be furnished on order.

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There's a size, too, to meet most requirements—nine sizes in all, providing capacities up to 720 GPM, and heads to 200 ft.

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The stuffing box (2) is on the suction

side of the impeller, subject to suction pressure only. Or we can equip your pump with either a single or double mechanical seal. Completely sealed bearings (3) keep out dirt and moisture, and are grease lubricated.

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And you can keep your parts inventory low, for many of the parts are standardized for interchangeability between sizes. For example, you need only two different shafts for all 9 sizes of Fig. 3715 pumps.

We'd like to send you additional details about these chemical pumps. Just drop us a line, asking for Bulletin 725.4. It gives performance curves, sizes and specifications. Or, if you have a pumping problem of any kind one of our representatives will be glad to consult with you about it.



Goulds stainless steel pump handling corn meal mush in a food plant.



This Goulds chemical pump is handling hot fatty acids in an oil processing plant.



These three Goulds chemical pumps circulate hot size in a textile plant.





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Malodorants—usually mercaptan or cyclic sulfide—are added in small percentages to odorless nat-ural gas and to liquid petroleum gas to provide a means of quick detection when escaping gas or leakages occur. In the handling of these substances there are bound to be accidental spillages. To determine the most effective means of neutralizing the overpowering odors arising therefrom, a recent exhaustive survey, independently conducted, found our NEUTROLEUM\* to be the most acceptable all-purpose masking agent tested. Highly concentrated and inexpensive, this powerful specialty provides remarkable odor coverage at negligible cost....
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#### RESEARCH

(Continued from page 7)

Now, what about the question, "How much research should we do?" If the foregoing conclusions are valid for the future, the more research the better. However, if a company is to survive and grow - the principal commercial reasons for performing research — it must have strong earning power and, in addition to paying its taxes, must pay its investors a satisfactory rate of return on the money put into the business.

With what is left from earning, plus the regulated rotation of capital already in the business (depreciation), the company can expand. As a general rule, the amount of research an established company should do can be determined in important measure on the basis of its ability to obtain capital for the future. This is why it is self-evident that industrial chemical research can only be useful if it is integrated with equally competent groups responsible for engineering, sales, operation, finance, and all the other functions which must be performed in a well-managed company.

It might be pointed out, however, that if research is not done, the other groups cannot use their talents effectively in promoting the company's

In considering the data from the group of chemical companies previously mentioned, it is possible to show a relationship of research expenditures to growth - namely, the ratio of increase in investment during a given period to research expenditures dcring an earlier but equal period. This ratio is surprisingly consistent at approximately \$4 of increased investment to \$1 of previous research expenditures.

A conclusion that can be derived from these data is that the compaines involved have had a reasonably good balance between research expenditures and ability to obtain capital. Further increase in their research expenditures relative to sales might make it possible to be even more selective in choosing projects for commercialization so that the return on investment might be increased; drastic reduction in research expenditures in relation to sales would hardly seem worth considering in view of the experience of the past fifteen years.

#### Shows sandblasting equipment

Abrasive blasting machines, cabinets, nozzles, hose, safety equipment, and accessories are cataloged in 20-page bulletin, "Sandblast with Clemco", available from Clementina Ltd., Dept. CP, 2277 Jerrold Ave., San Francisco, Calif. When inquiring specify CP 7823 opposite last page.



They are both built to take it . . . for long, gruelling service. Both are engineered to the Nth degree. Boeing selected a Nagle 2" type "SW-OB" vertical shaft, centrifugal pump for pumping a chromium solution into dip tanks. Many parts of Boeing planes are processed with chromium to provide a durable exterior finish. with chromium to provide a durable exterior finish. Production schedules rule out leakage, failures, packing troubles. This Nagle Pump was designed to climinate these troubles. Nagle Pumps are built for abusive service only—handling abrasive, or corrosive materials or hot liquids. Get the facts—send for Catalog 5206.



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Write to these addresses for more information on conventions and exhibits listed on page 5 of this issue.

American Association of Textile Chemists and Colorists, Lowell Textile Institute, Lowell, Mass.

American Chemical Society, 1155 Sixteenth St., N.W., Washington 6, D.C.

American Institute of Chemical Engineers, 25 W. 45th St., New York, N.Y.

American Nuclear Society, c/o Engineers Joint Council, 29 W. 39th St., New York 18, N.Y. Stewart E. Reimel, Sec'y.

American Pharmaceutical Manufacturers Association, 608 Fifth Ave., New York 20, N.Y.

American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

The Chemical Market Research Association, 27 William St., New York 5, N.Y. Robert Henderson.

Forest Products Research Society, N. Walnut St., Madison,

Instrument Society of America, 10th Annual Exhibit, Exhibit Manager's Office, 3443 S. Hill St., Los Angeles 7, California

IRE Materials Symposium, c/o Merritt A. Rudner, Dir., Electronics Research, Fluorocarbon Products, Inc., Div. of United States Gasket Co., Camden 1, N.J.

Manufacturing Chemists Association, 1625 Eye St., N.W., Washington 6, D.C. Geo. Worden, Dir. of Publ.

Massachusetts Institute of Technology, Cambridge 39, Mass. Prof. Ernest H. Huntress, Dir. of Summer Session.

National Petroleum Association, Munsey Bldg., Washington 4, D.C.

National Plant Food Institute, 1700 "K" St., N.W. Washington 6, D.C. Wm. S. Ritnour, Sec.-Treas.

Production Engineering Show, c/o Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y.

Technical Association of the Pulp and Paper Industry, Sixth TAPPI Testing Conference, Wm. Schoenberg, Exhibition Chairman, 1878 E. 18th St., Cleveland 18, Ohio.

Western Electronic Show & Convention, 344 N. La Brea Ave., Los Angeles 36, Calif., Herbert Cerwin, Publ. Dir.

Western Plant Maintenance Show, 759 Monadnock Bldg., San Francisco 5, Calif.

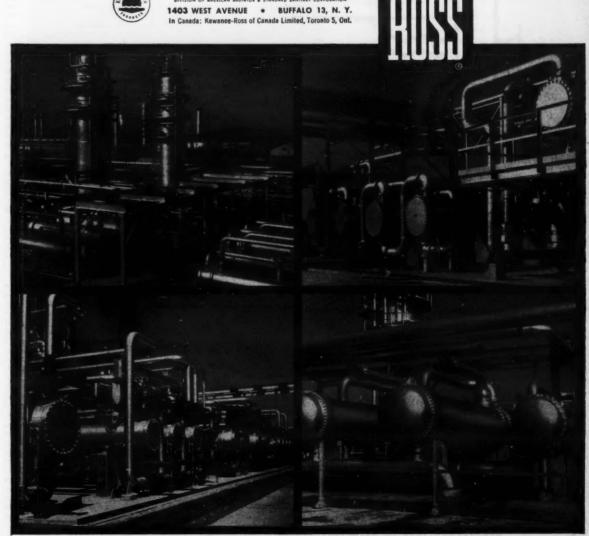
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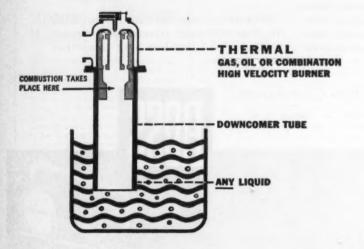
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### Discussed in this issue -

# PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here-if you want more data you can write manufacturer direct . . .

or turn to inside back cover and use the handy "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you-information comes to you direct,

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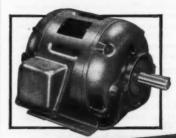


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\*U.S. Patent No. 2,565,846, Aug. 28, 1951



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Roselle, New Jersey

Metal Textile Corporation of Canada, Ed., Hamilton, Ont.

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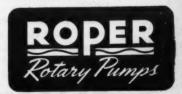
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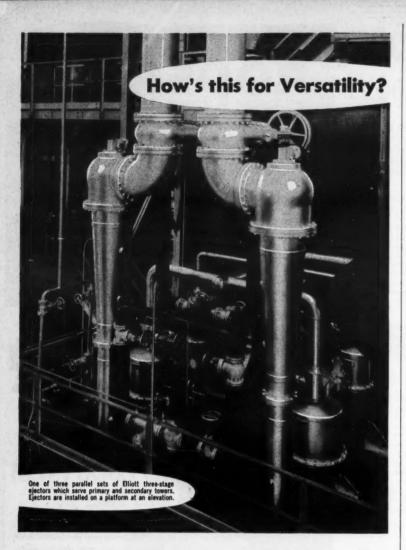






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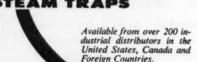
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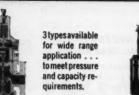
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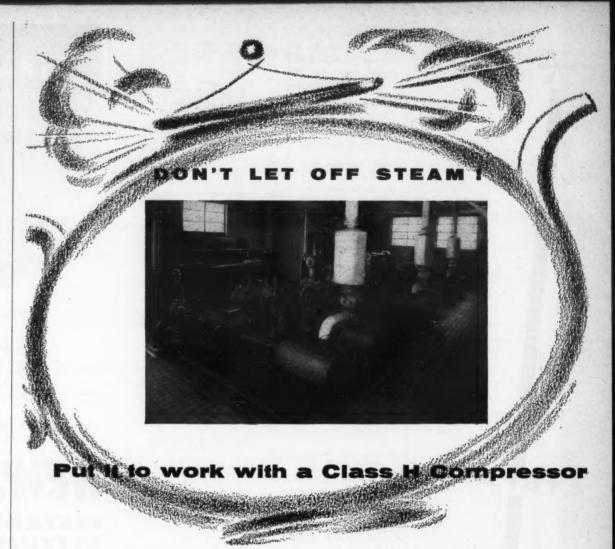
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Pink streets

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(Continued from page 2)

### Inflatable fabric provides strongest beam

Rubber-coated nylon fabric, recently announced by Goodyear Tire & Rubber Co., provides the strongest structural beam for its weight ever developed. Called "air mat", the material is woven, coated, and fabricated as two plies of superimposed fabric with nylon threads of fixed length connecting upper and lower plies. Possibilities for design are numerous - some already in mind include inflatable work platforms, portable shelters, collapsible furniture. The mat, weighing only two pounds per square yard, will hold high pressures and provides excellent insulation.

### Atom watchers use 3-D

An unusual periscopic, stereoscopic telescope now makes it possible for atomic scientists to photograph radioactive specimens in 3-D. The instrument, which "sees" behind thick high-density concrete walls, was designed and built by E. Leitz, Inc., of New York for the Knolls Atomic Power Lab.

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